ELECTRICAL TIMES

THURSDAY
29 JUNE
1950
SIXPENCE

Radio Engineers

SEND FOR THIS NEW FOLDER

ON B.I Callender's

Cables for Public Address Systems

It contains specifications and illustrations of BICC microphone cables, loudspeaker cables, and associated wiring accessories suitable for all kinds of public address and paging systems. Write today for Publication No. 275U.

BRITISH INSULATED CALLENDER'S CABLES LIMITED
NORFOLK HOUSE, NORFOLK STREET, LONDON, W.C.2

Just wish...

..and it's yours!

How convenient to have such a magical delivery service now that the reduction in Purchase Tax is stepping up demand. But the B.N.E. service is nearly as good—stocks of *Charlton* Electric Water Heaters are held at B.N.E. depots all over the country and your requirements can usually be met within a matter of hours. The range includes Non-pressure, Pressure, 'Twin' Dual-purpose, and Cistern type Storage Heaters and Immersion Heaters and Circulators—in fact a type for every domestic requirement. Ring your nearest B.N.E. depot* when you have an urgent order.

**There is one at your local J. & P. Branch.*

BRITISH NATIONAL ELECTRICS LTD.

The Domestic Appliances Section of JOHNSON & PHILLIPS LTD.
NEWARTHILL · MOTHERWELL · SCOTLAND

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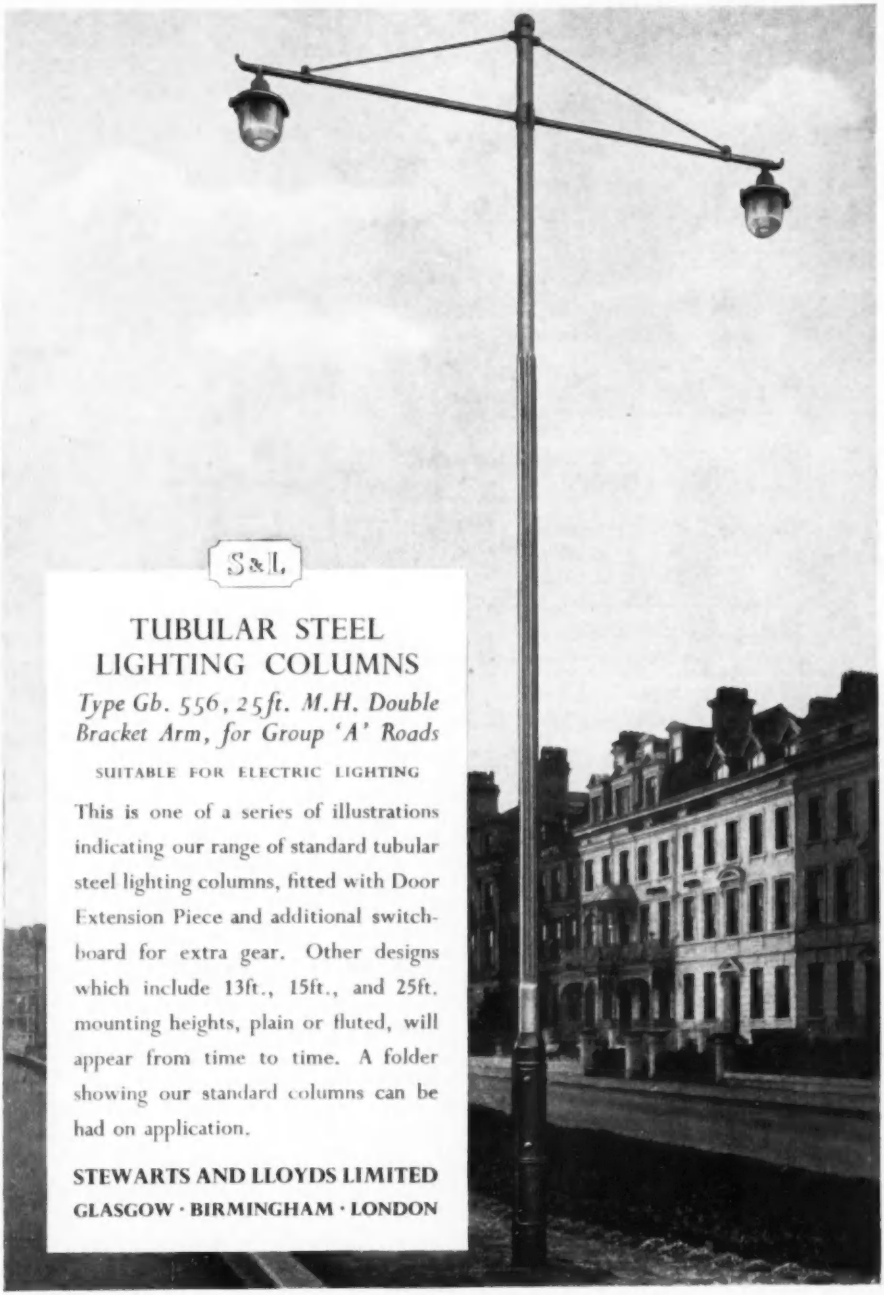

S&L

TUBULAR STEEL LIGHTING COLUMNS

Type Gb. 556, 25ft. M.H. Double Bracket Arm, for Group 'A' Roads

SUITABLE FOR ELECTRIC LIGHTING

This is one of a series of illustrations indicating our range of standard tubular steel lighting columns, fitted with Door Extension Piece and additional switchboard for extra gear. Other designs which include 13ft., 15ft., and 25ft. mounting heights, plain or fluted, will appear from time to time. A folder showing our standard columns can be had on application.

STEWARTS AND LLOYDS LIMITED
GLASGOW · BIRMINGHAM · LONDON

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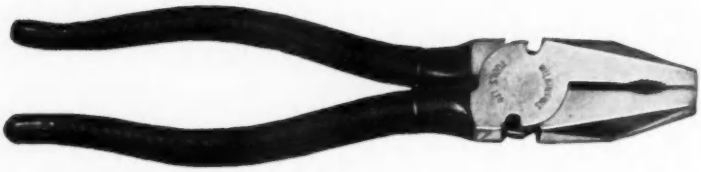
ESPECIALLY for the Electrical Industry

as used by British, Irish and Dominion G.P.O., Ministry of Supply, Admiralty, War Office and British Railway Executive.



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WILKINSONS' TOOLS LTD., KERFOOT STREET, WARRINGTON, LANCS.

Manufacturers of Pliers, Pincers, Nippers, Telegraph Tools and C.T. Wrenches

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CW4 W10

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By R. S. Edwards, Professor of Economics (with special reference to industrial organisation), University of London. An important contribution in the field of applied economics, with useful material on the organisational and financial aspects of this subject. 20/- net

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Parker Street, Kingsway, London, W.C.2

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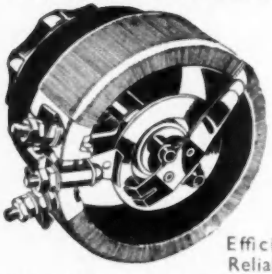

Efficient and Reliable, these instruments are second to none. Our Technical service will be happy to advise you in any difficulty, so do not hesitate to get in touch with us soon.

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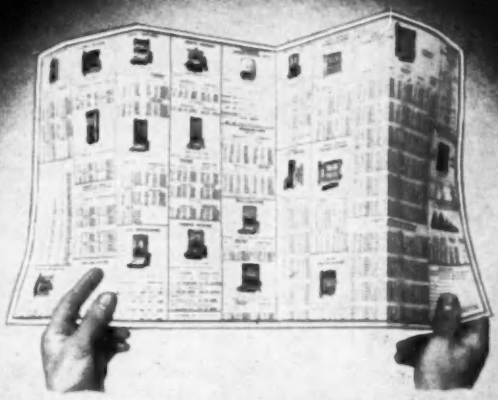
THE CRESSALL MANUFACTURING CO., LTD.
Tower Street, Birmingham 19

Telephone: ASTon Cross 2666 (3 lines). *Telegrams:* "OHMIC" Birmingham



PUBLICATION Nº 450GL GIVES
CONSOLIDATED REDUCED PRICES OF
BILL SWITCH AND DISTRIBUTION GEAR

A COPY WILL BE SENT ON REQUEST

SCOTLAND & N. IRELAND.
J. D. HARRIS,
47, NETHERBURN AVENUE,
NETHERLEE,
GLASGOW. S.4.

BILL SWITCHGEAR LTD
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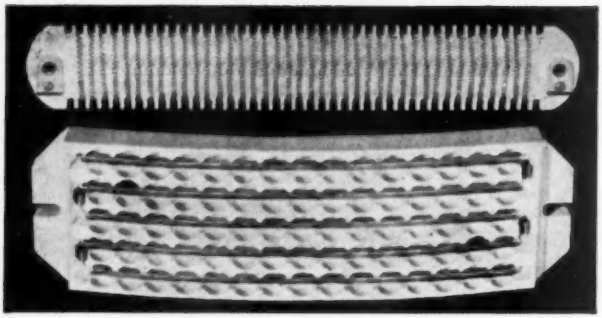
PHONE: BIRCHFIELDS 5011. GRAMS. "BILSWITCH," B'HAM

1912



1950

The Story of BELLING *& Company Ltd.* No. 7

My last chapter took us to the end of the first World War and explained how for season 1918/19 I got out a new list embodying many appliances we had worked on during the war.

I have previously mentioned that we often found wall plugs and sockets burnt out, and we had also another trouble which arose with the fire switches burning out. These two troubles are what first gave me the idea of starting a separate company to make these particular accessories specially for the job. The war being over I contacted Captain Arnold, R.A., who you will remember was one of the original partners with me in Belling & Co., and who was then in Germany, to see if he would like to join me and go into business again making these accessories. He was quite agreeable so together we formed and financed a company called the Heavy Current Accessories Co. The name of this company was a little later on changed to "M.K. Electric Ltd.", which as everyone in the electrical industry today knows is one of the very foremost companies in the electrical accessories business. Great credit is due to Mr. Arnold for its development since the early days, as he has, of course, been the really active everyday Director.

Getting back to Belling & Co. In early 1919 we made our first effort at producing a small pressed steel cooker. This was our "Modernette" Cooker and made entirely of sheet metal. Many actually are still at work today, and we have had very few complaints. This was in a way the first of the famous long line of Baby Belling Cookers. Season 1919/20 came along, for which I produced still another new catalogue. We had a roaring demand for our fires from all quarters, and many of these were considerably improved in design. Biggest sellers were the "Standard", the "Office" and the "Boudoir". Season 1920/21 was more or less a repetition of the previous year.

1921 was, however, one of our notable years as in this year we brought out our first "Multi-parabola" firebar. It was an enormous and instantaneous success. After many attempts in soapstone the design almost as it stands today was evolved. This step, broadly speaking, introduced the 1 kw. unit firebar, which very rapidly superseded the original 500 watt unit. It was the biggest step forward in the electric fire industry, and is still standard today. As, of course, everyone knows, this type of bar has since been copied by nearly everybody in the electric fire trade.

The other great event of this year was that just about the beginning of the fire season, in October I think it was, our Works at Edmonton were completely gutted out by fire. We had to do some quick thinking, but fortune was with us and we secured some premises in Ponders End, an old wartime factory, which enabled us to carry on and at any rate meet part of the season's demands. We also very quickly got the roof and the first floor back on the Derby Road Works and as the walls were intact we were able to make use of both works. Here I must give due credit to the Atlas Insurance Company — they paid up the £10,000 insurance immediately. This, of course, helped us to rebuild, etc. We had a tough time but got through.

I am afraid I have rambled along from 1912 to the present date, 1921, without mentioning any of the employees who had joined us and been helping me in the meantime. However, their long service figures are very interesting and I will give you some details next time.

C. R. Belling

Belling & Co. Ltd., Bridge Works, Enfield, Middx. Tel.: Howard 1212

CRC7

The New G.E.C. PLASTIC PREHEATER

- Greatly reduced maintenance costs
- 2 kW. High Frequency output
- Several pounds of material can be preheated at each charging—at approx. 1½ lbs./min.
- Operating controls reduced to minimum
- Full information is in Publication No. P.H. 1130.

THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

WORLD ACCLAIM!

"Sterline"

overhead low-voltage transmission cable, embodies features which we can justly claim to be abreast of, if not in advance of the times. Not only do we ignore climatic extremes, we know STERLINE has a lower initial cost—is lighter in weight and is easier to handle than the "old" braided and compounded weather-proof aerial wire. Needless to say, we have made and are still making many thousands of miles of the type we now call "old", simply because we stress the importance of pleasing all cable users.

Full details of STERLINE will be sent on request: these will include specification, sizes, weights and prices.

STERLING

CABLE COMPANY LIMITED

ALDERMASTON BERKSHIRE

TELEPHONE READING 1000

TELEGRAMS "STERLING PHONE READING": WORKS AT ALDERMASTON AND WARRINGTON, LANCS.

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IDLE MACHINES COST MONEY!

If you have damaged or burnt-out motors around your works send them to BROOK for repair

QUICK & EFFICIENT SERVICE
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Induction-Repulsion or Commutator motors of all makes repaired, A.C. or D.C.

BROOK MOTORS Ltd

No.8 REPAIR WORKS HUDDERSFIELD

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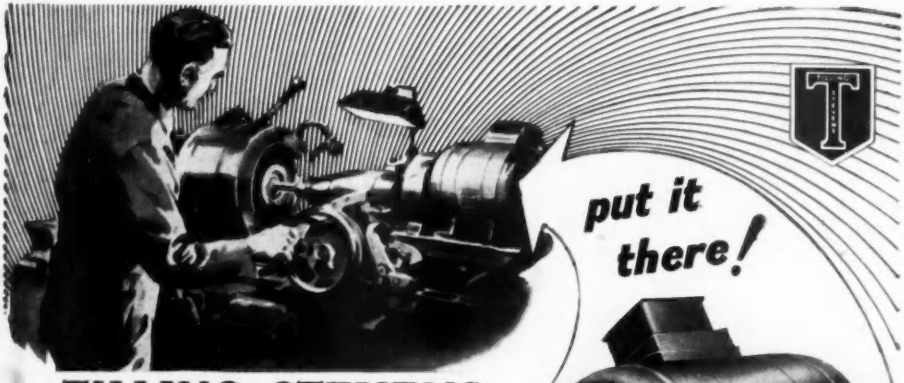

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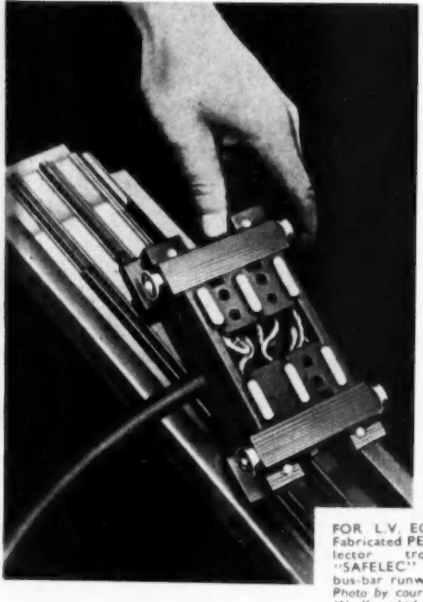
electric motors

can be applied to a variety of uses—providing economical *driving power* for individual machines and appliances or machine shop transmission.

Single phase ¼ to 1 h.p., three phase ¼ to 10 h.p. Fractional Motors up to 1 h.p. supplied with Sleeve Bearings if required.

TILLING-STEVENS LTD • MAIDSTONE • KENT • ENGLAND



where

STRENGTH

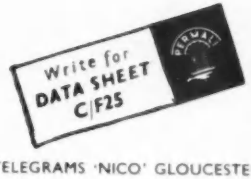
is vital . . .

INSULATE WITH

PERMALI

Laminated · Impregnated · Densified

FOR L.V. EQUIPMENT. Fabricated PERMALI collector trolley for "SAFELEC" overhead bus-bar runway system. *Photo by courtesy of Geo. W. King Ltd.*



THE NEW INSULATION CO., LTD., GLOUCESTER · TELEPHONE 2494! TELEGRAMS 'NICO' GLOUCESTER

200,000 000 passengers per year !

At their Bus Division in Birmingham, the Metropolitan-Cammell Carriage and Wagon Company are using HENLEY CABLES for the fine new fleet of 450 buses now building for the London Transport Executive.

HENLEY CABLES

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD.
51-53 HATTON GARDEN, LONDON, E.C.1

The new fleet will carry approximately 200,000,000 passengers per year.

BY APPOINTMENT
ELECTRIC CABLE
MANUFACTURERS

The NEW R·E·A·L (REGD) PLINTH LIGHT (PAT. PENDING)

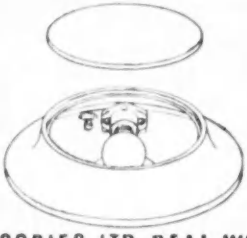
National advertising for the new R.E.A.L. Plinth Light is bringing hundreds of enquiries daily from all corners of the country, as well as from Overseas, and has captured the imagination of the Artistic World (as the right-hand illustration will prove) as well as the photographic world whose natural untouched photograph is given in comparison, to indicate in some small measure the possibilities of this new and intriguing Plinth Lighting.

May we let you have the fullest information and interesting literature?

also THE JUNIOR PLINTH

RETAILING AT 24/9 INC. TAX

CONSTRUCTIONAL DETAILS



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ROWLANDS ELECTRICAL ACCESSORIES LTD R·E·A·L WORKS B'HAM. 18

A triple achievement

by

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SPECIALIZATION . . BTH has specialized for more than 50 years in the design and manufacture of motors to suit the needs of machinery and machine-tool makers. Five factories are geared to customers' demand.

SIMPLIFICATION . . has followed progressively, and today a range of totally-enclosed fan-cooled A.C. squirrel-cage motors of proved performance and outstanding quality caters for all needs.

and now in progress

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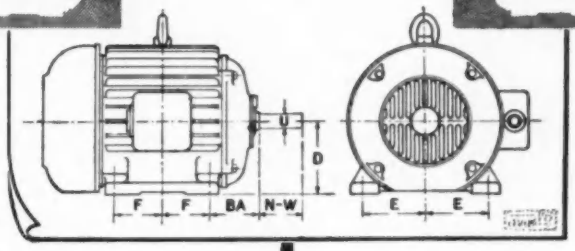

STANDARDIZATION

Standardization of fixing dimensions, shafts, and h.p. steps from 1 to 20 h.p. achieves interchangeability of motors of leading makes — a co-operative effort of considerable significance to makers of power-driven machinery — especially for overseas customers.

THE
BRITISH THOMSON-HOUSTON
COMPANY LIMITED, RUGBY, ENGLAND

A4168

Cost A LITTLE MORE *Last* A LOT LONGER

It is true that PYRAMID cost a little more than ordinary aluminium utensils, but then, there never was anything quite the equal of PYRAMID aluminium ware for hotplate cooking. PYRAMID utensils are specially manufactured with quarter inch thick bottoms; they are solid drawn in steel dies, and their thickness and quality cannot vary. They are scientifically ground by a special process to give a dead flat surface and are so constructed that distortion is avoided. Consequently, PYRAMID utensils continue to give "all over" contact with the hotplate, and so save electricity, for years after their cost has been forgotten.

PYRAMID

ALUMINIUM WARE

HAGUE & McKENZIE LTD., PYRAMID WORKS, BIRMINGHAM 1

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Craftsmen of the Future

Budding "Potholer"

This is Vincent Atkinson, a young explorer of "pot-holes," the famous underground and water-logged cavern-labyrinths of Derbyshire. That, of course, is merely his hobby. Vincent is a Thorncliffe apprentice and from Pre-Entry Course he progressed to craft instruction in our Pattern making and Joiners Shops. At the moment he is busy with the City and Guilds Course at Barnsley Technical College in Carpentry and Joinery.

Newton Chambers Training Scheme is our practical interpretation of the National need for the training of the Craftsmen of tomorrow.

It is thus we strive to ensure a continuity of the spirit of enterprise and craftsmanship in each phase of this Company's ever-growing activities in engineering, chemical technology and in the field of national competition for the world's business.

NEWTON CHAMBERS

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Recuperators, Air Heaters, Economisers and General Heavy Engineering Products in Cast Iron and Mild Steel

FERRANTI

7-Range CLIP-ON AMMETER

RANGES

0 – 10 Amps
0 – 25 "
0 – 50 "
0 – 100 "
0 – 250 "
0 – 500 "
0 –1000 "

FERRANTI

- Thumb-operated switch
- Fully insulated
- Accuracy within 3% of full scale
- Can be applied to bare or insulated conductors up to 2¼ins. diameter
- Weight...3lbs.

Delivery from Stock

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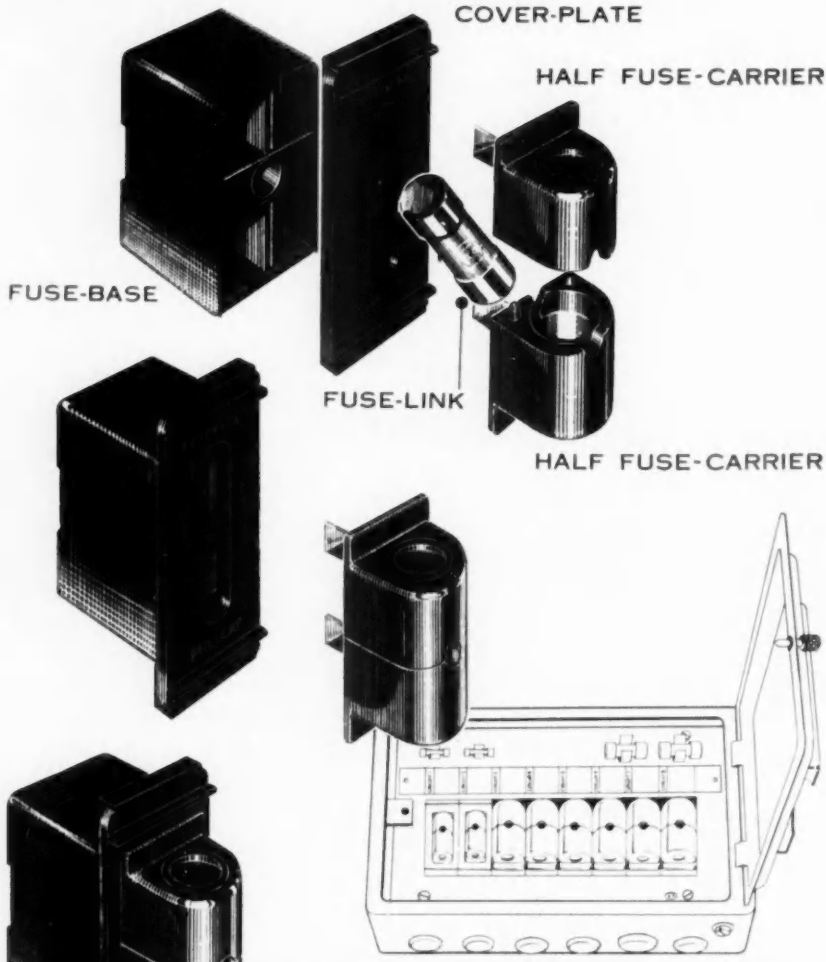
Caps off to Pullcap



PULLCAP FUSES

RATED AT 5, 15, 30 AND 60 AMPERES

TO B.S.88-CATEGORY OF DUTY 440 AC4

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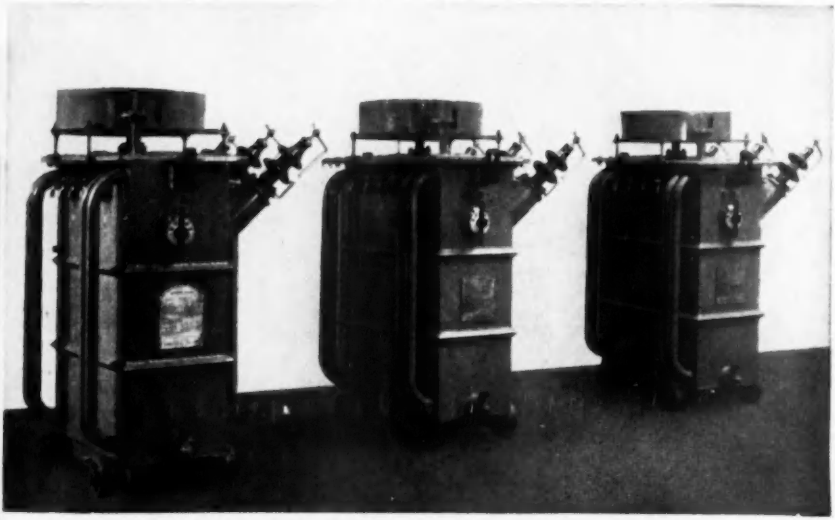
MANUFACTURERS OF "ELEPHANTIDE," (REGD.) INSULATING PRESSBOARDS

HERMETICALLY SEALED!

Thompson Relief Chamber (Patented)



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Designed to give

trouble-free service under damp and humid conditions, this type of unit is operating perfectly in India, East and West Africa, Malaya, Ceylon, etc.

NO MOISTURE or ACIDITY of OIL
NO SLUDGING of OIL
NO SERVICE COSTS

STANDARD TRANSFORMERS UP TO 2,000 KVA ALSO SUPPLIED

Apply for Brochure to—

THE LINDLEY THOMPSON TRANSFORMER & SERVICE CO. LTD
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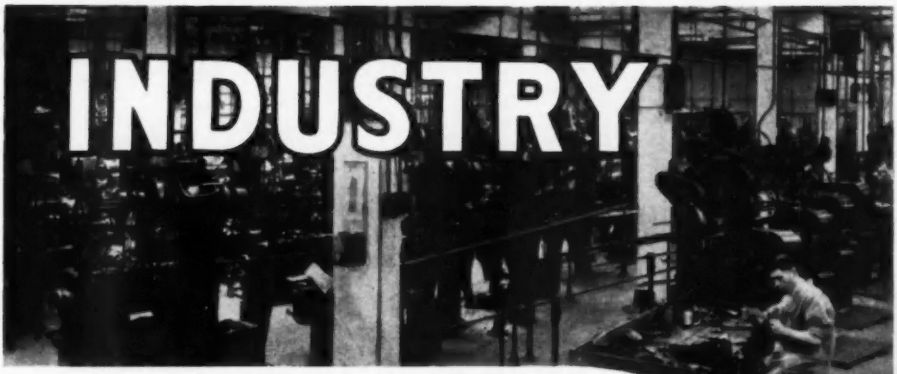
LANGLEY (BUCKS) 200-201



needs the strength and reliability of

KERSONS

5-amp. IRONCLAD GEAR

Sturdy construction, heavy gauge material, sound design, durable finish and attractive appearance make these Kersons units the "choice of the connoisseur" for today's industrial installations.

The range includes one to four gang switches, vertical and horizontal switched shuttered socket-outlets, and water-tight switches

THE KERSONS MANUFACTURING CO. LTD., HANSONS BRIDGE RD., BIRMINGHAM 24

Proprietors: J. H. TUCKER & CO., LTD., Birmingham

SOLONS FOR YOUR SOLDERING JOBS!

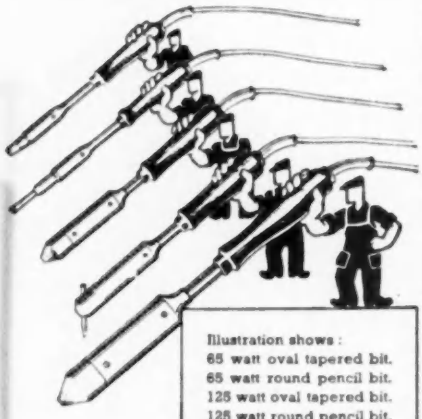


Illustration shows:
65 watt oval tapered bit.
65 watt round pencil bit.
125 watt oval tapered bit.
125 watt round pencil bit.
240 watt oval tapered bit.

These five models will satisfy practically every soldering demand whether for the occasional household job or continuous soldering under workshop or factory conditions. With the Solon the heat is in the bit itself . . . continuously . . . hour after hour; all connections housed at end of handle away from heat. Each model complete with 6 feet Henley 3-core flexible. Now available from stock. Write for folder Y.10.

HENLEY SOLON TRADE MARK ELECTRIC SOLDERING IRONS

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TELEGRAPH WORKS CO. LTD.
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Achievement and Service

Our activities, extending over a period of forty years, have been uninterruptedly devoted to the study and solution of problems associated with design, construction and operation of steam superheaters for all purposes.

Knowledge we have acquired and applied has not only pioneered and extended the use of steam at elevated temperatures, but has done much to stimulate development in the art of steam generation.

Specialised experience, unique manufacturing resources and first-class engineering service have successfully achieved wide diversity of application in the power plant field and established a reputation of which we are justly proud and endeavour always to uphold.

That is why "MeLeSco" Superheaters are specified and so extensively employed for all operating conditions in water tube boilers of every well-known make.

The SUPERHEATER Company Ltd

The Authority on Superheated Steam

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Works: TRAFFORD PARK, MANCHESTER, 17

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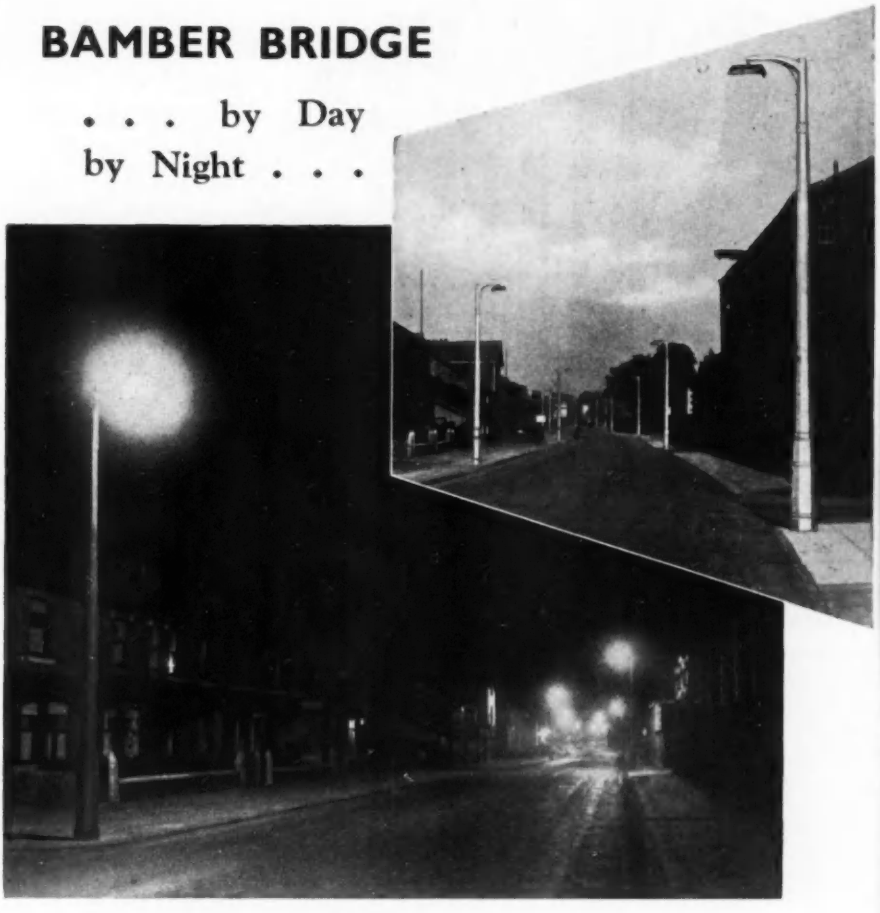
BAMBER BRIDGE

. . . by Day
by Night . . .



Another Installation of

Revo

STREET LIGHTING EQUIPMENT

This fine example of street lighting is typical of hundreds of Revo installations in this country and abroad.

The equipment shown above was actually installed and erected by the Revo Street Lighting Department, which is available for this purpose. Lanterns using sodium vapour discharge lamps, are mounted on concrete brackets and 'Phidias' concrete standards, the latter belonging to a range of Revo designs passed by the Royal Fine Art Commission.

REVO ELECTRIC CO. LTD., TIPTON, STAFFS

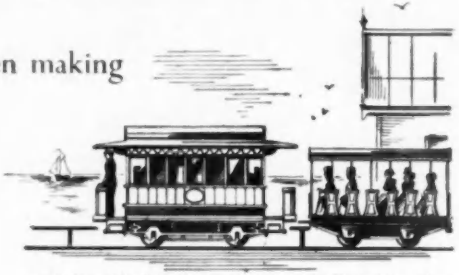
SMITHS

THE WORLD'S MOST COMPLETE RANGE OF ELECTRICAL TIMEKEEPING EQUIPMENT

SUPPLY THE WORLD WITH TIME

SMITHS ENGLISH CLOCKS LTD.
SECTRIC HOUSE, LONDON, N.W.2

John Wilkes have been making copper and brass for electrical use since the days of **Sir W. Siemens.**



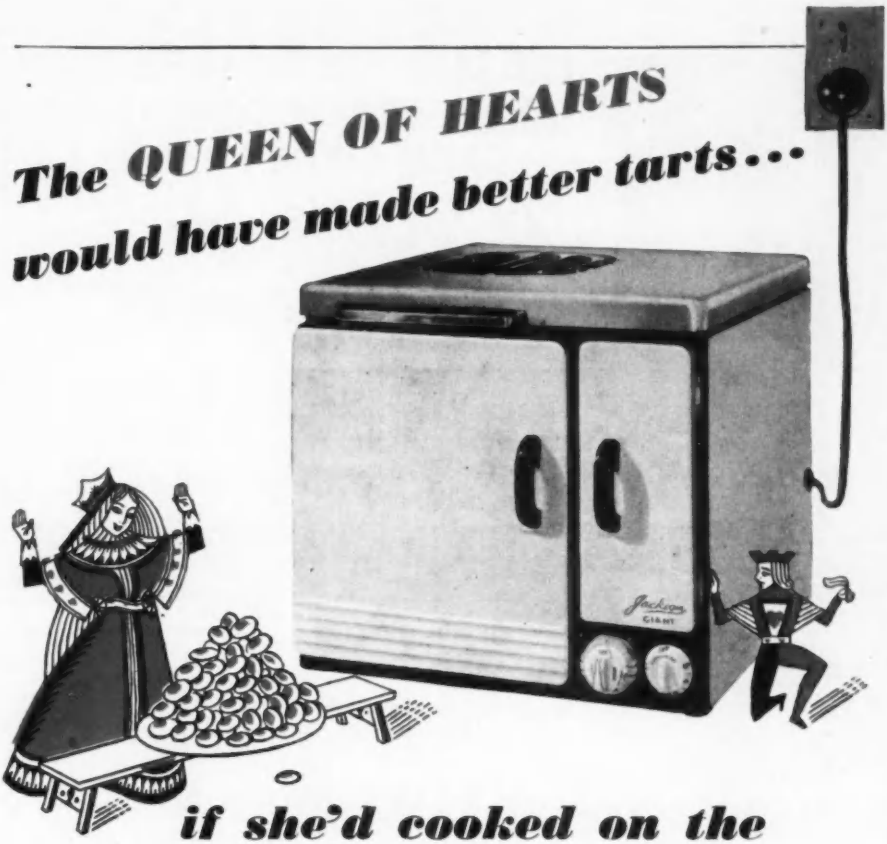
a train on the first electric system in the United Kingdom.

The great electrical pioneer, Sir W. Siemens, was largely responsible for the installation at Portrush in Northern Ireland of the first electric railway in the U.K., opened in 1883. Other developments in electric traction quickly followed. Among the firms to which railway engineers turned for good quality copper and brass was that of John Wilkes, already established over sixty years. Today, the products of John Wilkes, Sons & Mapplebeck Ltd. retain the high reputation they earned in those early days.

JOHN WILKES, SONS & MAPPLEBECK LIMITED, Birmingham 18

WBS

The QUEEN OF HEARTS would have made better tarts...



if she'd cooked on the 'GIANT' that Jackson built

Made for the smaller families . . . smaller flats . . . but for full-sized meals. Every modern feature will be found in the famous JACKSON 'GIANT'. Self-contained oven with thermostat control. Independent Radiant Plate with 'Simmerstat' control. Efficient grill. Large hot cupboard. No special wiring or control panel required. A marvel of electric cooker construction.

The specially designed stand for the Giant Cooker can be supplied with one or two cream vitreous enamel shelves, which are interchangeable. They may be used as a saucepan shelf and as a hob cover.

And it can be connected to a power point (13 amp.)

THE JACKSON ELECTRIC STOVE COMPANY LTD
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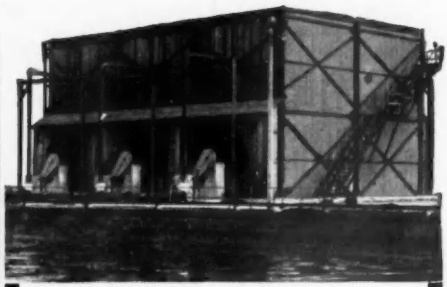

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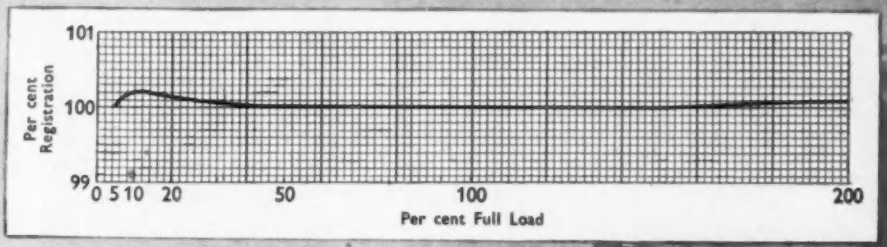

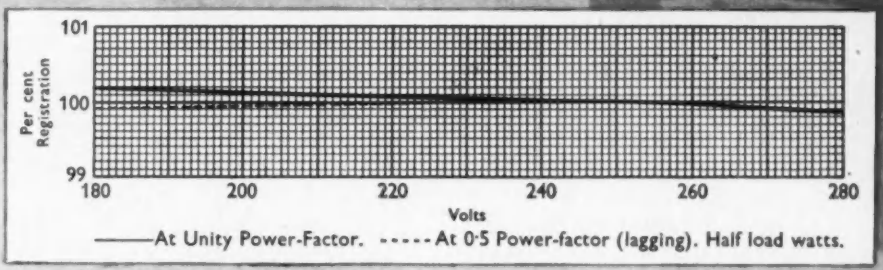

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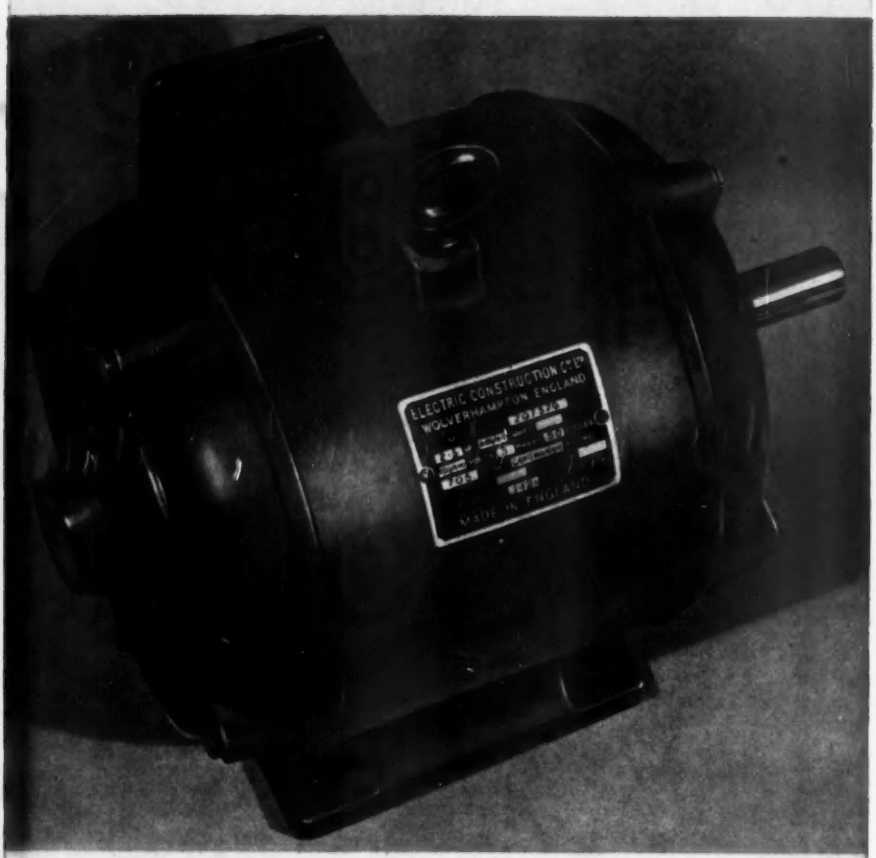

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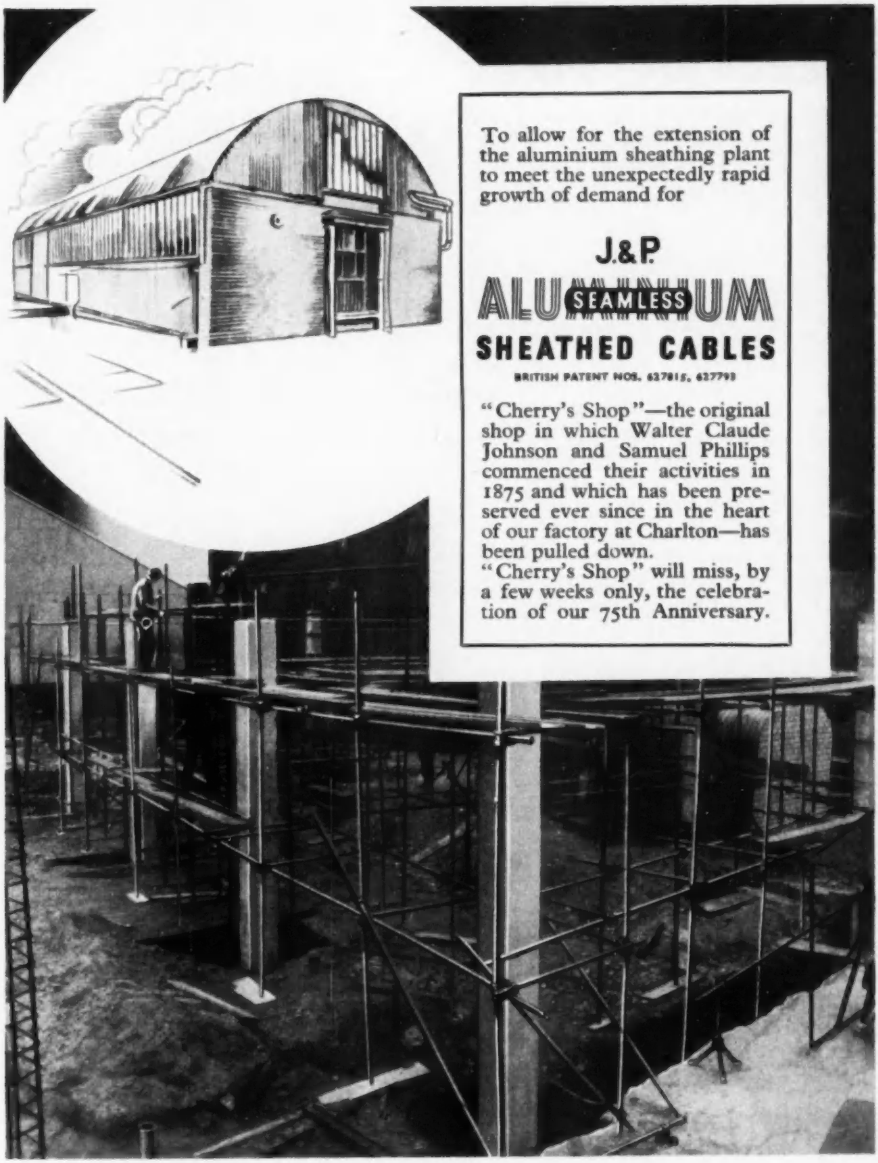

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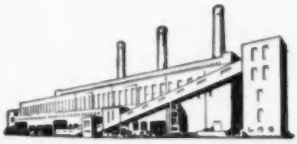

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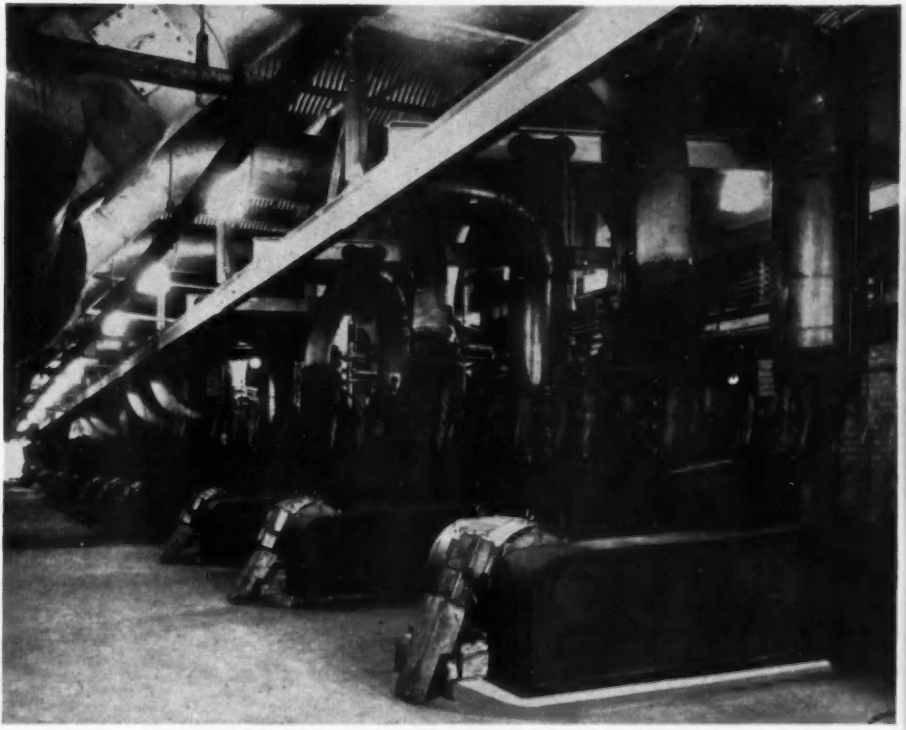

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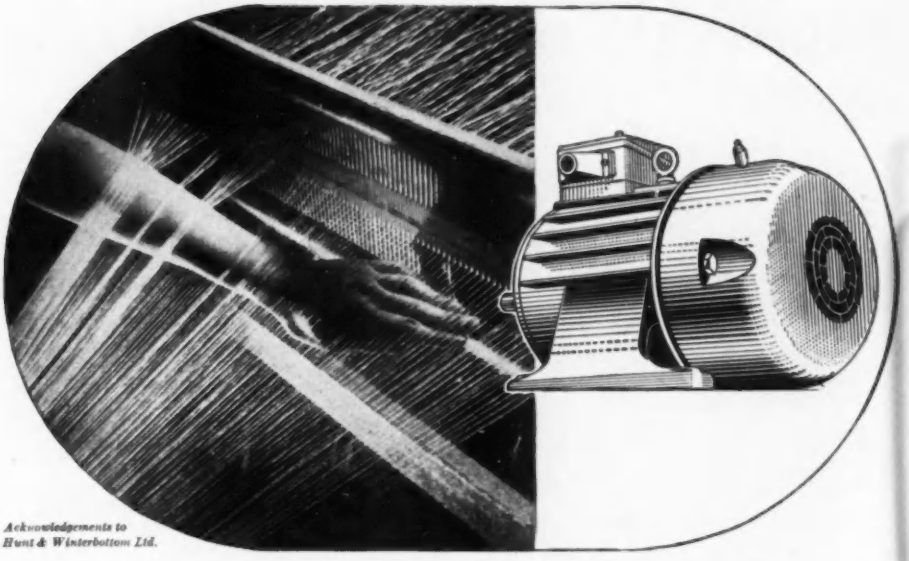

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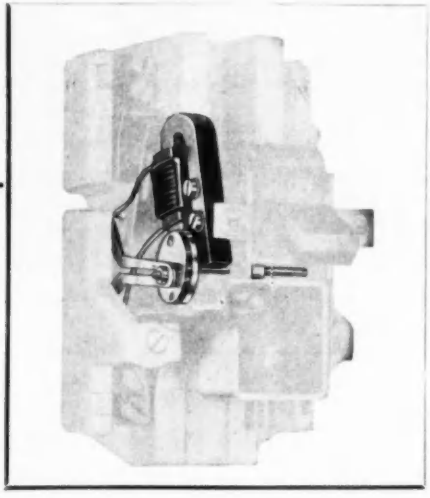

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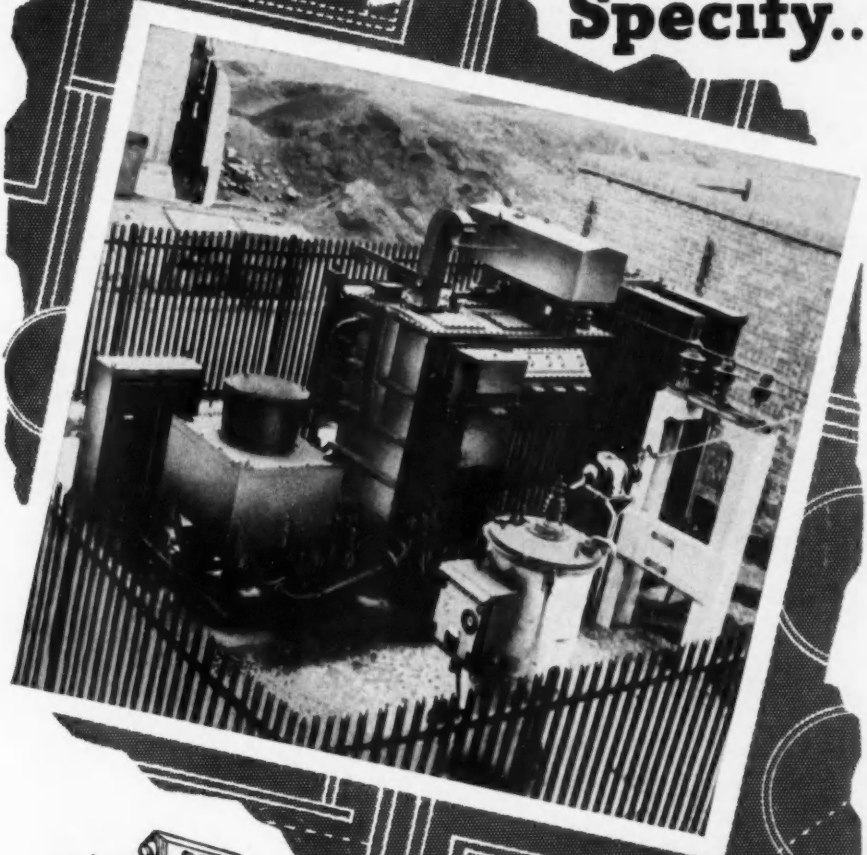

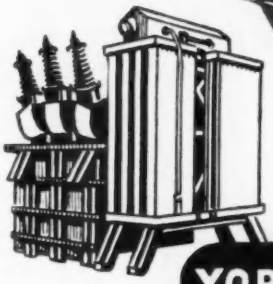

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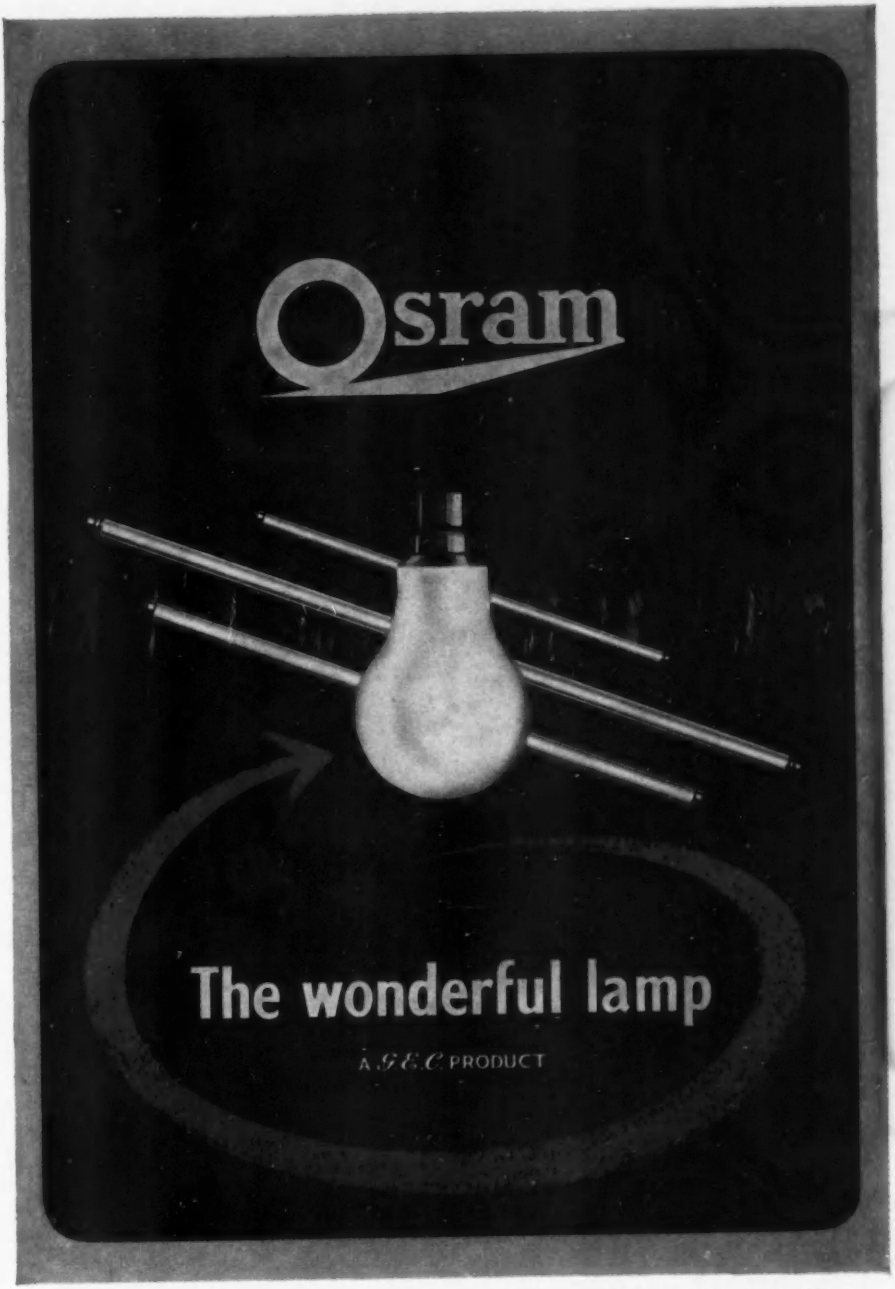

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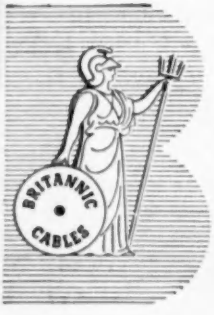

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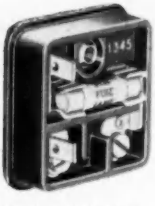

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ELECTRICAL TIMES

Vol. 117 No. 3060 THURSDAY, 29 JUNE, 1950

PUBLISHED EVERY THURSDAY

FIFTY-NINTH YEAR OF PUBLICATION

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Editorial

A BETTER CONVENTION

THERE can be little doubt that the B.E.P. Convention was a marked improvement on that of last year. True, delegates may have preferred the sea air to the doubtful weather which Yorkshire provided and there was a lack of a focal point such as that provided by the Torquay harbour. Nevertheless, the compensating virtues of an improved timetable, a better selection of B.E.A. representatives and a more attractively displayed exhibition outweighed the disadvantages. It was a happy thought also for the North Eastern Board to welcome delegates with a booklet recounting both the electrical and general attractions of the district, in a style referred to by the Mayor as better than Harrogate itself could produce. The local sub-area also deserves congratulations on the skilful way they blended different light sources to provide an excellent and varied floodlighting display of the principal buildings. A dark spot on the proceedings was the absence of E.C.A. delegates, which aroused much comment and led to many probably incorrect hypotheses. However, taking the Convention as a whole there can be little doubt of its success.

AND A BETTER EXHIBITION

WE also heard less criticism of the exhibition this year. Perhaps this was due to its lay-out in a continuous double row of stands, so that once the willing victim was lured within the entrance, he had to pass all the stands before making good his escape. A further improvement was the arrangement whereby facilities were afforded for B.E.A. members resident in the surrounding district to pay a day's visit to the exhibition. This is a scheme which might be suitably extended, for only in some such way can B.E.A. district managers reasonably expect to pay more than one visit in a lifetime. A difficulty may lie in the natural gravitation of the Convention to the South Coast, which would provide a disadvantage to those managers in the North, but at least it is a move in the right direction of assuring exhibitors of the maximum attention.

JUGGLING WITH LIGHT

ONE of the highlights of the Convention was the paper on Lamps and Lighting by Mr. L. J. Davies. To refer to it as a paper, however, is to do it less than justice, for it was better described as a commentary on a demonstration, the like of which we have never seen. The stage was set as though for a super Maskelyne & Devant show, and so in fact it proved to be. For this, tribute is due also to Mr. Davies' assistants who only once strayed from their perfection of timing. We hope that Mr. Davies will take the opportunity of presenting this demonstration to other audiences, indeed a somewhat less technical version might well be offered to the organisers of the Festival of Britain.

THE NEXT YEAR

THE next convention is to be held at Brighton, and the announcement so early is perhaps a confirmation that the demand for accommodation will be more easily met than this year. The major subject will presumably be utilisation, for the time is overdue for a full discussion of this branch which is not only providing the industry with some of its greatest headaches but was traditionally a strong point of the former I.M.E.A. meetings. The papers must, however, be chosen with the greatest care if they are to attract the maximum attention, for interest quickly flags if they are too specialised in nature, as the small attendance at the power papers this year demonstrated. Perhaps a departure from

the recent practice of grouped papers might create a livelier attraction. If utilisation is to be the major subject, it might have been thought appropriate to select an area board chairman as president for such a convention. The appointment of Sir Henry Self to this honour indicates that the simpler course has been taken, of appointment by precedence.

HISTORY REPEATS ITSELF

THE Government's restrictive attitude towards capital expenditure on electricity supply and distribution is sufficiently perplexing to divert the attention of most engineers from similar starvation of an important branch of our own industry—the telephone service. Attention has been focused on this quite recently, by Sir Alexander Roger, chairman of Automatic Telephone and Electric Ltd., who pointed out that waiting subscribers now number 550,000 on published figures, but whose potential number is probably more than a million. He also stressed that . . . "these waiting subscribers could provide the Post Office with well over £6 million of annual revenue, as well as aiding the full employment policy which is in danger of recession in our industry." It is strange how history repeats itself. Twenty-five years ago, in his capacity of chairman of the newly formed Telephone Development Association, inaugurated in this very building, Sir Alexander said, ". . . The Government looks upon the Post Office not as a business concern, but as a mere department which has to be starved, like any supply departments, in times like the present, and it seems to me to be beyond their capacity to realise that additional telephones mean employment and prosperity in every direction."

KEEP OFF THE PHONE!

THE position regarding the installation of new telephones is much more serious than most people realise. Although the waiting list of 550,000 is equivalent to over 10% of the 5,171,491 'phones installed in this country (March figures) only 65,317 were installed during the year, representing an increase of less than 1¼%. In 1923, a year in which trade was at an exceptionally low ebb, the number installed was 101,729, which represented a 10% increase on the total at that time. It is unfair to make a direct comparison of these percentages, of course, but it is an illuminating thought that with an organisation geared to over 5,000,000 'phones, we should only succeed in installing about 60% of the number achieved 27 years ago. It is claimed that the limitation on capital expenditure is solely responsible for the poor results achieved, in which case it looks as if the Government is saving the telephone industry as a sort of employment lifebelt which can be inflated when occasion arises. It would be as well to remember, however, that lifebelts which are kept uninflated too long may be found to have perished when they are most needed. It is also significant that, although it is a difficult task to obtain even a business telephone, a teleprinter, requiring a considerably higher capital outlay, is a comparatively easy matter.

FACILITATION OF LACTATION

ON our visit to the Royal Show, which opened on Tuesday, we were disappointed not to discover any further developments towards the replacement of Buttercup's udder-cloth by more up-to-date methods. It was suggested some time ago that increase in milk yield, normally obtained by massaging with hot cloths, could be obtained more hygienically with a current of hot air. This could be arranged by trunking to each stall (thus giving the hay-dryer a bit of spare-time load), or, if "individual motorisation" were preferred, by a hair-dryer screwed to each cow. We had hoped, however, that some enterprising manufacturer would have realised the relative inefficiency of air as a heat transfer medium and arranged a direct heating system permanently fitted to each cow and plugged in as required. Will no manufacturer be enterprising enough to design an udder-cosy, on the lines of an electric blanket, in time for next year's Show?

Meteor

Replacement of Decayed Poles

A simple method of determining Safety Factor

by J. E. McV. CALWELL, B.E., M.I.E.E.

NOW that the age of many overhead transmission lines has reached 20 years or more, the question of pole decay has become increasingly important. The engineer responsible for the maintenance of overhead lines would usually have in mind two factors when deciding to replace a decayed pole: (*a*) the safety of the public and/or the electricity supply, and (*b*) the economical life of the pole. In general, the progress of pole decay is comparatively slow and the engineer who is more concerned with safety may remove a decayed pole sooner than really necessary, while the engineer who is more concerned with the economic factor may allow a pole to reach an unsafe state of decay.

Although in practice it will be found impossible, in every case, to make decayed pole

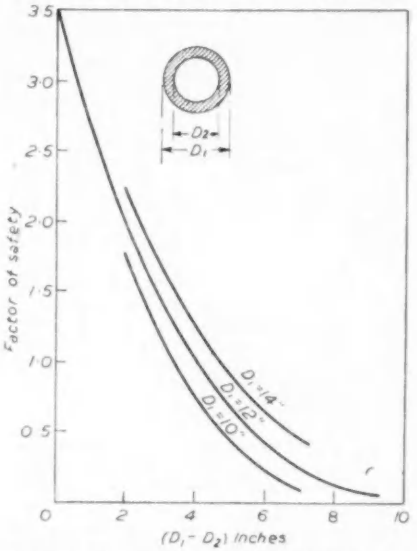


Fig. 1.—Reduction in safety factor with external decay

replacements at the most effective time, the following notes suggest a method whereby the maintenance engineer can feel that his decisions to replace decayed poles are based, to a certain extent, upon a scientific basis.

Fig. 1 shows the reduction in the factor of safety of a wood pole when its effective diameter is reduced by external decay. Fig. 2 shows the same relationship for a pole attacked by internal decay. By using one or other of these

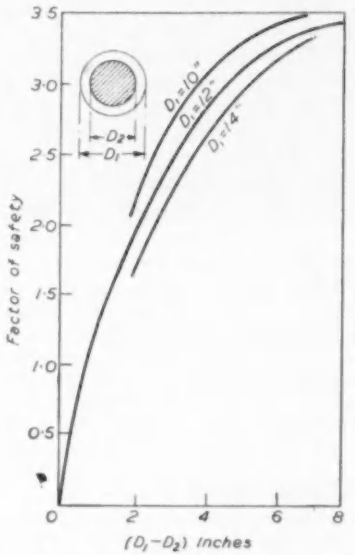


Fig. 2.—Reduction in safety factor with internal decay

sets of curves it is a simple matter to judge the approximate factor of safety of a decayed pole.

Examples

The following examples will suffice to explain the method. In each case, consider a pole originally 12 in. in diameter at the ground line and having a factor of safety of 3·5 in accordance with the Overhead Line Regulations.

1. *External Decay.* All round to a depth of 1 in. Since the depth is 1 in. $D_1-D_2=2$ and from Fig. 1 for a 12 in. pole the factor of safety is seen to be 2.

2. *Internal Decay.* The entire centre being decayed to within 2 in. of the periphery, so that $D_1-D_2=4$. From Fig. 2 for a 12 in. pole we

find that the factor of safety is approximately 0·4.

3. *Combined Internal and External Decay.* From 1·5 in. depth to 3 in. depth, the centre and an outer ring being sound.

For the sound centre $D_1 - D_2 = 6$ and the factor of safety from Fig. 1 is seen to be 0·4.

For the sound outer ring $D_1 - D_2 = 3$ and from Fig. 2 the factor of safety is 2·4.

The overall factor of safety is the sum of the two, i.e. $0{\cdot}4 + 2{\cdot}4 = 2{\cdot}8$.

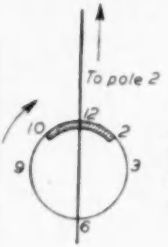


Fig. 3.—"Clock" diagram for reporting position of pole decay. The specimen shown would be coded "10—2."

Minimum Safety Factor

The next step is to decide upon the minimum factor of safety at which the decayed pole should be left in service and here the engineer must judge according to the local conditions. In general, it would not be unreasonable to allow the factor of safety to fall to at least 2, but due consideration must be given to such items as the probable wind, snow and ice conditions, the importance of the transmission line and the possible damage to life and property should the pole collapse.

Reporting Decay

In an extensive transmission system, the maintenance engineer may economise considerably in the time and travelling required for making check inspections, by arranging that the patrolman's reports of pole decay are set out in a standard form.

By adopting the clock-face method (so familiar to riflemen) for determining the sector of the pole section that is attacked, as indicated in Fig. 3, and also reporting type, depth and height of the decay, the patrolman can convey in his reports sufficient information to enable the maintenance engineer to keep a careful record of the progress of the pole decay. Since, as stated above, pole decay advances slowly, it is sufficient for the patrolman, after submitting his first detailed report, simply to keep the affected poles under regular observation, and to give the next detailed report only when the decay has gone appreciably further.

Examples of typical reports are:—

1. External decay 2 in. deep, ground level to 6 ft above, sector 10-2. (See Fig. 3.)

2. Internal decay, slightly hollow, ground level to 7 ft above, sector 12-3.

3. Internal decay, very hollow, ground level to above 8 ft, sector 12-12.

With this report data, the maintenance engineer can see which poles require immediate attention and make the necessary check inspections. By sounding the pole with a hammer (a lath hammer is a useful tool), and boring for samples (usually at 3 o'clock and at 9 o'clock), he obtains the necessary information to estimate the present factor of safety of the pole and then to determine what action should be taken.

NEW BRITISH STANDARDS

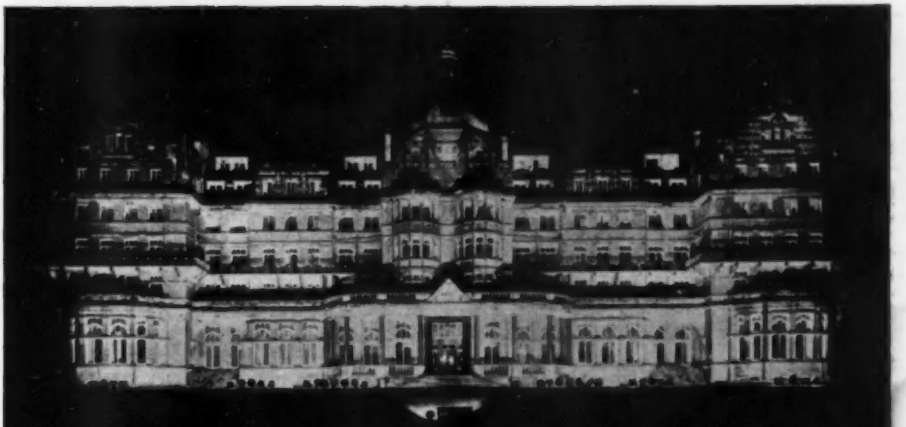
Mild Steel Castings of High Magnetic Permeability. *B.S. 1617: 1950. Price 2s.*—One of a series of standards for steel castings for general engineering purposes, this is intended for use where special magnetic properties are required for electrical applications. The standard covers two grades of castings for which chemical compositions and mechanical tests are set out. Recommended values for the magnetic properties are included and recommendations for welding procedure are given in an appendix.

Two-pole and Earthing-Pin Plugs, Socket Outlets and Socket Outlet Adaptors. *B.S. 546: 1950. Price 3s.*—This specification, although to a certain extent superseded by B.S. 1363: 1947 (fused-plugs and shuttered socket-outlets for general domestic purposes), has been retained to provide for extensions of existing installations, and for other purposes for which this type is preferred.

Modifications required in the light of modern manufacturing technique are incorporated in the revision of this standard, but the essential dimensions affecting interchangeability are not altered. While the main object of the specification is to ensure interchangeability, features of design affecting safety in operation are also included. Materials to be used are described, and various constructional requirements are set out for standard ratings of 2, 5, 15 and 30 amp.

Cotton and Selvedge Tapes and Webbing for Electrical Purposes. *B.S. 633: 1950. Price 2s.*—Changes in the specification from the 1935 edition include provision for an "extra fine insulating tape and the exclusion of tapes or webbing cut as strips from cloth." Measurement techniques are altered, and the minimum weight clause has been removed. Five classes of unsized cotton selvedged tape and webbing are covered by the standard, but tapes and webbing used for the manufacture and jointing of cables are not included.

Copies of the above, obtainable from the British Standards Institution, 28 Victoria Street, S.W.1.



Convention Diary

QUIETLY and unobtrusively the 1950 Convention commenced with the B.E.A.'s own private meeting. This year the papers presented at this one-day session have been made available to the technical press, a step we welcome and one also that raises the question of whether this meeting should really take on the semblance of a gathering of atomic scientists. Proceedings ran long, and the official opening of the exhibition was delayed until 5.0 p.m., although in reality it had been opened for several hours. Unobtrusively also past presidents of the I.M.E.A. foregathered at a reunion tea at the invitation of Mr. F. Newey. In the evening the stalls of the Royal Hall were cleared for dancing at the Mayoral reception; the pit remained as seating for the guests.

The formal proceedings opened on Tuesday, upon a stage flanked by two transmission towers of a reduced scale construction which defied the normal laws of mechanical design. In similar vein, the president's suggestion that Lord Citrine should defy the Chancellor by turning his blind eye, was appreciated by all, not least by Lord Citrine himself. But these proceedings we have already reported in our issue last week.

Sir Henry Self's paper occupied the afternoon session and its all embracing nature offered delegates as free a range of subject as the debate on the King's Address to Parliament. The discussion did not lack its bright spots, but we could not help wondering how different it might have been under the greater freedom of I.M.E.A. days.

Illustrated above is the Majestic Hotel, Harrogate, floodlighted with a combination of dispersive and projector fittings with green fluorescent tubes in the cupola

Once again, while delegates were changing into evening dress, the Royal Hall was transformed from a conference hall to a dance floor, in readiness for the president's reception. This event was the usual duplication of the Mayoral reception, the distinction being the order of shaking hands.

Wednesday suitably provided a dull day for the paper on lighting. In the past we have heard many lectures on lighting and seen many demonstrations, but never one so comprehensive, or so well presented as that provided by Mr. Davis. It is unfortunate that no inkling of this demonstration was given in the programme for it would have brought an even larger attendance. Surprisingly, this undiscussable paper produced an excellent though short discussion.

In the afternoon the three coach tours took place; they call only for the consoling comment that the weather might have been worse.

The major technical event, the three papers on generating plant occupied the whole of Thursday. The proceedings are reported elsewhere. In the afternoon the attendance was

Sir Henry Self, Lady Self, Mayoress of Harrogate, Mayor of Harrogate, Ald. Whiteley, Lady Ferranti, Sir V. de Ferranti, Lady Citrine, Lord Citrine, Lady Hartley, Sir Harold Hartley and Mr. J. W. Simpson

disappointingly poor, with only just over one hundred present. As there were nearly seventy divisional delegates as well as manufacturers, it is sorry comment on the interest taken in the other man's job.

E.A.W. Luncheon

Thursday was also Ladies' Day, with the E.A.W. luncheon at which Sir Vincent de Ferranti proposed the toast of E.A.W. Jubilee Year. He said that it needed a new generation to get accepted new ideas such as electricity and pointedly remarked that was where the ladies helped. Twenty-five years ago electricity was used only for lighting. The Association had done good work since then and he was sure they would do as good in the next twenty-five years.

In replying to the toast, Mrs. G. A. Tatchell, J.P., referred to the great help that the Association had always received from the Ferranti family. Councillor Mrs. Fisher, J.P., toasted the guests and in reply Mr. H. H. Mullens showed himself at home in addressing a predominently feminine audience.

The speeches at the annual dinner were, in the main, disappointing. Entertaining, though they were, it seemed to us that this climax of the convention demanded a greater measure of sterner substance.

By Friday morning there were few delegates unaware that Sir Henry Self had been selected as the next president and that Brighton was to be the new venue. Consequently the closing session passed with the usual slickness associated with amendment of bye-laws, the principal of which was the provision for the appointment of a vice-president in future years.

ANNUAL DINNER

THE principal toast at the annual dinner, that of "The Electrical Power Industry," was proposed by SIR HAROLD HARTLEY (chairman, Fourth World Power Conference). He had been greatly impressed during the convention by the good fellowship among those attending it, by their co-operative outlook, their confidence and their fighting spirit. At the same time, in the discussions he had missed a little of the rough and tumble about costs which existed in the old days between the accountants and the engineers, and which he had always found most illuminating. Electricity had given a new social and industrial pattern to the world. This was a challenge to the industry, and a great responsibility which must be faced. Looking at the figures of world production generally, it was seen that the curve was beginning to bend over but there was no sign of that in regard to the use of electricity. In his presidential address last year, Lord Citrine had said ' Electricity is the most potent agent known to mankind and there are no foreseeable limits to its myriad uses." No words could express better the faith and belief of all of them.

The PRESIDENT, responding to the Toast, said it would be agreed that the Harrogate Convention had been a most successful one. The object of these conventions was that all in the industry should meet together and find out what were the real problems to be solved. This year the convention had concentrated on the efficient conversion of the energy of coal into useful work. He had found it a valuable experience to hear what other people in the industry were doing to bring us that cheap and abundant supply of electricity that used to be talked about so long ago. He hoped they would all leave Harrogate believing that we were moving rapidly towards the time when electricity would be available for all and that the productivity of the country would rise to new heights.

LORD CITRINE proposed the toast of "Our Guests," and said he was an irrepressible optimist in regard to the electrical power industry.

The MAYOR OF HARROGATE (Alderman C. E. Whiteley) responding, said that at one time Harrogate had a wonderful electricity undertaking which was able to contribute to the rates. Now it appeared that electricity in Harrogate would cost another £3,000 a year and, altogether, they were £8,000 to £10,000 a year worse off! However, this must be regarded as service to the public in endeavouring to provide the greatest good for the greatest number.

The PRESIDENT then announced that as the result of the golf tournament, the Electrical Industries Benevolent Association would benefit by £35.

Steam Generating Stations

Modern boilers and turbo-alternators and their efficient operation are discussed at both Thursday sessions at Harrogate

Steam Station Operation

By J. D. Peattie, B.Sc., A.C.G.I., M.I.E.E.

GENERATION was the theme of all three papers presented to the Convention on Thursday last, and the main paper, presented by MR. J. D. PEATTIE, B.SC., A.C.G.I., M.I.E.E. (B.E.A.), considered the problem as applied to the operation of B.E.A. steam stations. After reviewing the historical background he commenced on a general survey of technical progress, remarking that there was as yet no sign of saturation in the demand, and that the increase consequent upon the continued rise had been met by increases in the size of station and generating sets, not by the mere multiplication of numbers of stations. Judging by American experience, however, 100 MW may be a convenient maximum generator size.

Improvements in efficiency may be illustrated by considering sets installed in 1920, 1923, 1933 and 1941, which had ideal percentage efficiencies of 37·1, 40·6, 44·6 and 49·6 respectively, and corresponding actual values of 18·4, 21·1, 27·7, and 29·2. The temperature of heat rejection has remained steady, but the feedwater temperature has risen from 145° F to 400° F. Average performance, as distinct from the best, has risen continuously since 1920, except for a drop during the war years which was accentuated by poor fuel supplies and the need to keep in commission some old stations.

Availability of plant has been of major importance, and in 1949 there was an involuntary loss of capacity of 8·7% of the maximum output capacity, while overhaul averaged 15·5%. With the load on the average 73·0%, this meant that the mean margin of plant throughout the year was 2·8%. This, like the load and the overhaul total, was very unevenly distributed. The incidence of breakdown was comparatively steady, but during the year the 52-week moving average of breakdown decreased considerably.

Coal and Boilers

Mr. Peattie next analysed the expenditure of generation in some detail, and then went on to consider some details of operation. Coal supplies came first, the B.E.A. stations being considered especially as an outlet for the lowest grades of fuel. The amount of uncleaned coal reaching them has increased from about 7 million tons in 1939 to 17 million in 1948, during which period the total for cleaned coal has only risen from 7 to 10 million tons. Up to 1947, average ash contents had increased steadily from 11·4% in 1939 to 15·4%, but there was a welcome decrease to 14·8% in 1948. Calorific value in the '39-'49 period decreased from 11,520 B.Th.U/lb to 10,910 B.Th.U/lb, which on an annual fuel bill of £75 million is equivalent to nearly £4 million extra. Another important item is rail haulage and coal handling, which can possibly be eased by the provision of 20 or 40-ton wagon loads instead of the 11·56 tons which was the average early in 1948.

The President seen with the President-elect, Sir Henry Self, at the dinner

In the past inadequate attention has been given to the training of personnel concerned in the day-to-day operation of the boiler house, which probably has a greater effect on efficiency than does any other part of the station. Courses have now been instituted to correct this position. Within the next few years, however, there will be a profound change in the characteristics of boiler plants, with a general increase in rating and in pressure.

The most frequent locations of boiler breakdowns during 1949 were superheaters (78), tubes and joints (70), economisers (60), and grates and stokers (56). In all there were 418 breakdowns, with an average loss of capacity of 182 klb/hr.

Turbines

Turbine standardisation is setting a pattern, which may soon emerge, of 100 MW sets for base load operation, 60 MW sets for day loads and 30 MW sets for short period peak loads. Of additions projected during the next five years, 58 sets are about 30 MW and 75 are of about 60 MW, with 49 at about 50 MW out of a total of 188 sets. In connection with efficiency it has to be borne in mind that running cost depends as much on fuel cost as on efficiency, and that in order to achieve maximum economy, plant at a site where fuel is expensive has to be shut down immediately loading conditions permit.

During 1949 there were 180 turbo-alternator breakdowns, blading troubles (46) being the major cause in the turbine and rotor breakdowns (28) in the generator. The average capacity lost through each breakdown was 28·4 MW.

Advances in Boiler Plant

by W. F. Simonson, B.Sc.(Eng.), A.C.G.I., M.I.Mech.E.

BOILER plant and its probable development in the next few years was discussed by MR. W. F. SIMONSON, B.SC.(ENG.), A.C.G.I., M.I.MECH.E., in the first of the papers supporting Mr. J. D. Peattie. Prepared by the Water-Tube Boilermakers' Association, this began with a review of current B.E.A. construction programmes, and went on to consider boiler design in relation to availability. General features with this object in view include the avoidance of excessively high combustion rates, moderate heat release per unit volume in the furnace, lateral spacing of the tube surfacing in the hotter zones to prevent "birds-nesting," and in well defined banks throughout the unit, and special attention to "on-load" cleaning requirements.

Turning to present trends in boiler design, the limit of the travelling grate stoker is set down as for a 250 klb/hr unit. In cases where a high proportion of heat recovery is required in the air heater, the adoption of p.f. firing is practically essential, irrespective of boiler capacity.

Competing requirements of a safe gas temperature with regard to ash softening temperatures, and an adequate temperature gradient between gases and steam in the superheater, have led to the adoption of a vertically elongated design for boilers, giving an increased surface/volume ratio and a consequent increase in the heat transmitted by radiation as compared with convection. Higher feed water temperatures limit the scope for heat recovery at the economiser, and more heat has to be taken by the air-heater to keep up efficiency, a consideration which favours p.f. firing.

Superheaters

Close regulation of steam temperature is required by the turbine designer, and for this reason radiant superheaters incorporated in the furnace wall cooling surface have not been common in Britain. Although utilising the maximum possible temperature gradient, they have shown an erratic temperature characteristic with variations in load and fuel quality. Consequently the convection type superheater of the multiple loop design is normally employed, but it utilises radiant heat transfer

Dame Caroline Haslett with Mr. Victor Dale and Lady Hacking at the Convention dinner

Sir Harold Hartley chats with Alderman Sir Wm. Walker, J.P.

to an increasing extent, and is located in close proximity to the furnace outlet.

The self-supporting pendant type of superheater offers many constructional advantages, but the stipulation of suitability for two-shift operation in plants working at about 850° F has often resulted in preference for the easier starting facilities offered by the horizontal loop self-draining type. Methods of supporting this design are, however, a difficulty, the presence of any obstructions in the superheater gas passes being a disadvantage. Support for the loops at each end only is one successful answer, while a recent development is the adoption of steam-cooled supports.

Control of steam temperature has usually been obtained by the use of surface or spray-type attemperators located between a primary and secondary bank of superheater tube surfaces. The surface type is easier to control, but for higher pressures the spray type presents advantages. It does, though, call for a water supply of a high degree of purity. As an alternative to attemperators, the gas flow through the superheaters may be subject to damper control, while with p.f. corner firing some control may be obtained by changing the angles of the burners.

Steam purity is a requirement for high turbine availability, and the problem of obtaining it is largely mechanical, involving the maintenance of a steady water level in the drum, with a uniform distribution of water entering the drum and an equally uniform liberation of steam throughout its whole length.

Ash and Grit Handling

Some 74% of the B.E.A. boiler programme up to and including 1952 involves p.f. fired units, and for these some form of grit arresting plant is necessary. The type coming into general use in the large stations being erected, using stoker firing, is the multiple small diameter unit cyclone assembly, with which efficiencies from 90 to 95% are obtained, although with draught losses up to 2·75 in. w.g. For p.f. firing electrostatic precipitators are used, having 96% efficiency or better under test conditions. Low head hydraulic sluicing to suitable disposal areas is a comparatively inexpensive method of disposal.

Mr. Simonson went on to discuss future developments in methods of firing, such as the spreader stoker and the cyclone furnace, and devoted the rest of his paper to the consideration of specific current and future designs.

The Turbo Generator Field

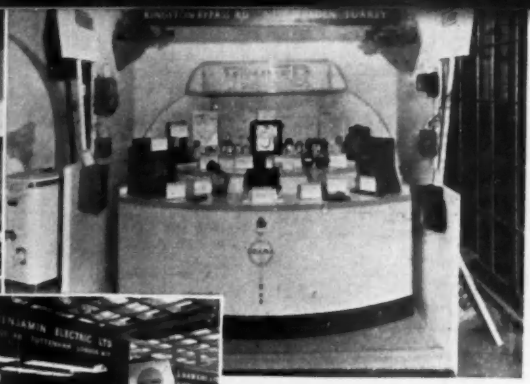
by J. T. Moore, B.Sc., A.R.T.C., M.I.E.E.

STEAM turbines, and alternators and associated plant were the subject of MR. J. T. MOORE, B.SC., A.R.T.C., M.I.E.E., who presented the third of Thursday's papers, which was prepared by B.E.A.M.A. turbo-generating plant makers. As with the other papers, a survey of present plant provided the early part of the paper. Sets below 15 MW are being replaced in this country, though, at present, they make up nearly one-quarter of the installed capacity, and much the same applies to the 15 to 25 MW range. In this higher rating division, most modern sets for Great Britain have been supplied for 400 lb/sq in., 800° F conditions and are of single cylinder construction. Alternators are air cooled, with direct driven exciters.

In the range 30 to 45 MW lies over one-third of the present B.E.A. capacity, nearly all these units running at 3,000 r.p.m., the flexibility of the machine at this speed being particularly useful in interconnected systems. Most modern plant is of two-cylinder construction, with steam conditions from 600 lb/sq. in., 825° F to 650 lb/sq in., 900° F, feed heating being in four or five stages to 340°/375° F. Alternators are air cooled with direct or gear-driven exciter, modern trends being towards 11 kV generation.

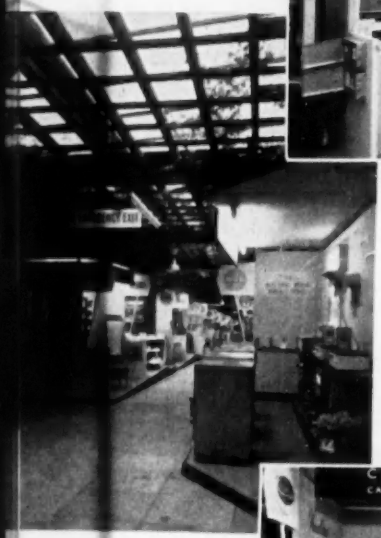
Existing 50-60 MW sets mainly run at 1,500 r.p.m., though recently increase of steam conditions have permitted 3,000 r.p.m. For the slower speed 350 lb/sq in., 720° F up to

(*continued on page* 1084)



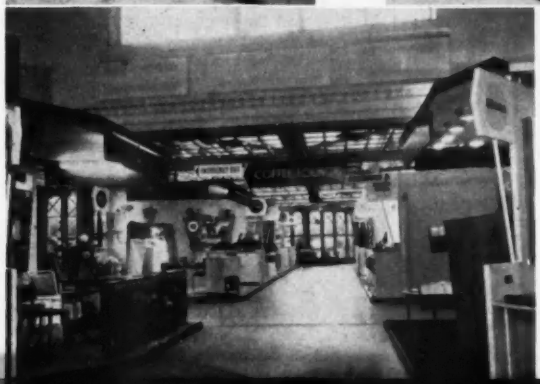
Convention

Pictures from many



Exhibition

angles of the scene



Mr. R. Birt and fellow delegates pose for our photographer before the coach trips

650 lb/sq in., 825° F are met, with feed heating in the range 258-358° F. Alternators are air cooled, with direct coupled exciters. For two-pole sets recent steam conditions have been 1350 lb/sq in., 950° F, and hydrogen cooling has been used for the alternators. Above 60 MW the speed of all tandem machines in service is 1,500 r.p.m., but there is a trend away from such sets.

Both national and international standardisation of turbo-generators is being investigated, the I.E.C. acting in the international field. In general, British proposals have been accepted as international standards, although alternative steam conditions have, in general, been included. Naturally, such standardisation has had its effect on proposed designs. Most large units will be of 60 MW capacity, designed for 900 lb/sq in., 900° F steam, and construction will be either radial for 1,500 r.p.m. and two- or three-cylinder axial flow 3,000 r.p.m.

Design Features

As a result of increasingly onerous steam conditions, various supervisory controls have been developed to help staff in their operating duties. The principal types are axial expansion indicators, which record the differential expansion between motor and stator; and eccentricity indicators, which show the out-of-truth, or "hogging" of rotors, such as is caused by unequal heating.

In the turbine proper, the trend in blade form design is towards the greater use of the twisted form, having a varied degree of reaction from root to tip. The effects of vibration, a serious detraction from reliability in service, are mitigated by turning the blades and by grouping them by shrouding and lacing to change the natural frequency. Exhaust end blading is provided with hard erosion/corrosion resisting inlet-end shields.

For emergency operation when load is suddenly removed, anticipatory overspeed limiting gear has been developed, the closure of high-pressure valves being initiated by the change of load rather than the resultant change in speed. Operation of the overspeed trip may thus be avoided. Other apparatus is designed to partially close the governor valve if the vacuum falls below, say, 25 in. Emergency valves are closed if the vacuum reaches 15 in.

Frequency of maintenance is debatable, but in general it is recommended that turbines should be opened up for inspection within 6 to 12 months of first commissioning, and thereafter at periods of from two to four years.

At the electrical end, to avoid copper shortening troubles, it is the usual practice to use hard-drawn copper conductors containing a small proportion of silver. Exciters are usually either direct coupled or gear driven, separate motor-driven exciters not being used to any great extent here.

For future standard 60 MW sets, hydrogen cooling will be incorporated, the stator being assembled and wound in one piece, or else fully wound on a separate core which is later assembled inside an outer stator casing. Gas coolers are housed in the stator frame, while, to prevent leakage of gas at bearings, special oil-sealed glands are used. Standard practice is to operate on a gas pressure of 0·5 lb/sq in., but machines are designed to be suitable for 15 lb/sq in. hydrogen pressure. Increase of pressure improves the cooling properties.

Condensers and Feed Heating

For condenser tube-plates, the emphasis is on deep steam lanes presenting a large tube area to the incoming steam. Tube fixing, which is of great importance in ensuring condensate purity, involves either the use of cone grips and packing or the use of expanded joints at each end, expansion pieces being incorporated in the latter case. Support plates, necessitated by exhaust steam speeds which may reach 450 ft/sec, are fixed at irregular intervals and arranged to lift the tubes slightly.

Four to six stages of feed heating are now common, de-aerators on direct contact heaters being widely used to provide one stage. There is a tendency with steam pressures in excess of 1,000 lb/sq in. to incorporate dual pumping, so that the high-pressure heaters are only subjected to a pressure midway between condensate pump pressure and boiler pressure. High-pressure heater heads demand massive fabricated or forged construction.

Discussion on Power Station Papers

J. N. WAITE (London Division, B.E.A.) was surprised that Dalmarnock and Barton had been chosen as milestones in the paper, as similar or higher steam conditions had been operated earlier at Carville and North Tees. Referring to thermal efficiency, he pointed the paradox that improvement in system load factor could worsen average thermal efficiency. The new plant coming into operation will immediately raise average efficiency and effect a coal saving.

To offset the increased capital charges for new plant, operating engineers hope for reduced costs as the result of standardisation. In relation to costs, he drew attention to flue-gas treatment, which entailed the industry in a heavy expense for which, he considered, no good purpose. Gas washing at 10s. to 12s. per ton of coal seemed to him to cause more trouble than it avoided.

He asked turbine designers for turbines that could be started up quickly and loaded quickly: what was base load plant now might not be so in 10 or 15 years' time.

MR. J. W. H. DORE (B.E.A.) thought that Mr. Peattie should have placed more stress on uniformity of fuel quality, which affected first cost, efficiency and availability. A liberal rating for boilers has, for instance, been necessary, and unless fuel uniformity is obtained, the cost of boiler plant may run away. Care should be taken not to associate too rigidly the idea of electrostatic precipitators and p.f. fired boilers: other forms of precipitator might be more suitable.

He suggested that troubles with established methods of firing were making engineers over-optimistic about alternatives, and counselled caution until tests had proved new techniques. With respect to Mr. Moore's paper, he questioned the wisdom of standardising a 100 MW set when we had not built it. Finally, he called for frank discussions between manufacturers and users on the costs of modifications.

MR. F. L. DONNISON (B.E.A.) considered improvement in productivity and the lessening of costs to be the principle aims of standardisation. Delivery had certainly been speeded up as a result, but so far there was little to show that prices had come down. With regard to new plant, he pointed out that manufacturers were inclined to be influenced by the optimum component plant efficiencies envisaged, but that users were only concerned at first with the average overall efficiency of the whole generating plant.

Supervisory control he noted as fitted mainly to 60 MW and larger sets. However, since B.E.A. operational efficiency was affected by the maximum safe rates of picking up and dropping load on medium size machines, he thought there was a case for having it on 30 MW sets.

Turbine outages, he thought, could be reduced by giving more care to the protection of completed rotors before assembly. Improved turbine casing joint technique was of great importance, as although various manufacturers had endeavoured to modify the conventional horizontal joint of the past, even on newly commissioned machines difficulty had been experienced in keeping the casings steam-tight for any length of time. With regard to anticipatory governors, he thought that closer attention to the main gear would pay better. For base load plant having unit boilers he recommended bled steam evaporators to maintain the unit principle.

MR. W. S. BURGE (E. Midlands Division, B.E.A.) first dealt with design policy in power station layout, with special reference to the unit system. With large plants in one station, with internal interconnecting "sympathetic" failure of sets via auxiliaries became a danger, with the consequent risk of "skittling" if there was insufficient Grid interconnection. This led to the idea that with external interconnection, internal isolation is advisable, and the unit system so favoured should stand to gain in capital expenditure if even the largest generators can be steamed through one boiler. The consequent reduction of civil engineering costs is specially desirable.

Finally, as an incentive to good station operation, Mr. Burge called for thermal efficiency to be expressed in terms of the steam cycle efficiency, the plant item coincident efficiency, and the operating factor. The product of the first two is equal to the spot test efficiency under perfect conditions; this, in turn, multiplied by the third, gives the conventional overall thermal efficiency. With the complete unit system the turbo-generator with its boiler or boilers would be, so to speak, a separate power station. If this proved to be the case, it opened the door to the introduction of a national standard of efficiency expression, and the operating factor allowed a close approach to a fair and reasonable method of assessing the true merits of power station operation.

MR. J. W. MAYER said that improvement of boiler running efficiency had been maintained, in

Lady Citrine, Lady Hacking, Dame Caroline Haslett amongst guests at the Ladies' Tea

spite of a fall in intrinsic plant efficiency, by improvements in auxiliaries. In regard to availability, he pointed out that boiler-breakdowns, if frequent, were seldom protracted. He suggested that, to improve operation and availability, boilers should be better housed. Cheaper materials could be used but more space was required in certain directions and 60% of the walls should be moveable.

He suggested that power stations should take more open-cast coal, as it was quite suitable for this purpose, having neither high ash content nor high moisture content and, moreover, possessed very good fusion qualities. He felt that the place of open-cast coal was in the power station, not the home.

MR. L. W. JAMES criticised the specification of only a half-voltage short-circuit test in the standard for 60 and 100 MW machines. Turning to operation, he noted that the most marked effect of hydrogen cooling was on noise and vibrations. With it, the boiler feed pump became a greater problem than the alternator. In America, it had been stated that hydrogen-cooled machines cost the same as air cooled, but this did not seem to apply in Great Britain.

MR. B. L. METCALF (I.E.E. and N.C.B.) said that Mr. Peattie's paper had been carefully studied by the National Coal Board. He suggested that it was, perhaps, not right to select conditions of plant, and then to demand coal to a given standard. Possibly, the policy of the B.E.A. was too perfectionist in choosing all machines alike. There was a big variety in run of the mine coals, even at the same colliery, and he pleaded for closer collaboration between the B.E.A. and the N.C.B., going into the divisions and regions. It might be well, he thought, to include coal preparation experience in the training of B.E.A. engineers and there was also scope for a conference devoted to a real effort to explore and examine the problems of the two industries, with some papers given possibly by the Coal Board, as well as by B.E.A. generating experts.

Mr. Metcalf queried if the B.E.A. was, indeed, the most important outlet for the lowest grade fuels. Colliery power stations were using coal of 6,000 B.Th.U./lb. with 30% dry ash content. The N.C.B. advocated the placing of small—say 20 MW—stations near central coal washing plants to use such poor fuels.

Mr. G. A. Vowles chats with friends in the lobby

MR. J. H. THOMAS (B.E.A. Director of Training) gave some details of the training of boiler operating personnel. Stokers from power stations were given residential courses of about a fortnight, covering elementary physics and chemistry, boiler construction and maintenance. The idea was not to make combustion engineers, but to encourage interest, and the scheme seemed to be having good results.

MR. H. J. BOCK emphasised the importance in regard to coal of such factors as grindability and ash fusion point. Turning to the capital cost of boilers, he suggested that acceptance of, say, ½% less efficiency would reduce the price and improve availability. To help boiler makers, the B.E.A. should issue reports dealing with plant troubles and detailing the remedies adopted.

He also suggested that insufficient attention was paid to the quality of water entering boilers, and supported Mr. Metcalf's idea of power stations erected at the pit head to deal with really low-grade fuels.

MR. J. L. ASHWORTH (N.W. Division) welcomed the information about supervisory controls, and asked for wider application. The cost of a 60 MW machine out of action in his division was £650 to £850 per day, due to less efficient sets having to carry its load.

MR. H. MIDGLEY (S.W. Division) suggested that modern power-station plant might be too complicated, with too many gadgets fitted. The cost of complication should be considered very carefully and also the fact that highly-trained technical people are necessary to produce and operate them.

CAPT. J. M. DONALDSON (E.D.A.) suggested that the cost of coal was immorally high, particularly as power-station engineers had to take what they were given. He thought that present civil engineering designs, particularly in relation to the boiler house, were too expensive, and agreed that it should be possible to take pieces off the sides. Perhaps that would not be regarded enthusiastically by the ordinary operating engineer, but if the bulk of the building were done away with he did not think that there would be any great disadvantage, and a great deal of money would be saved.

The Authors made brief replies to the discussion.

ELECTRIC VEHICLES ASSOCIATION

In our review of the B.E.P.C. Exhibition we omitted to mention the interesting display of commercial electric vehicles which was staged by the Electric Vehicles Association of Great Britain, at the entrance to the Sun Pavilion. A wide range of types were on show, with special demonstrations of control gear, etc.

Economics of Supply—Discussion

MR. A. M. F. PALMER (Employees' National Committee) considered that there were few firm conclusions reached in the paper in spite of its very wide approach. The economic strait jacket in which the industry was placed was a fundamental problem, but the electrical supply industry had the same right as steel and insurance interests to put its own case strongly to the public. It had to be stressed that electrification was essential, and for this purpose a spirit of electrical fanaticism was necessary on the part of every member of the industry.

The consultative consumers councils were, he thought, one of the most unsatisfactory features of the 1947 Act: the real guarantee of good consumer relations was cheap electricity with good service for 24 hours a day. It should be a point of principle to hold prices steady.

MR. J. ECCLES (Merseyside and N. Wales E.B.) dealt with the rise in price of electrical power above the 1939 level—12·6% in comparison with increases for coal (180%), generating stations (150%), steel (100%) and electrical cookers (80%). The price had not increased more because the industry was, effectively, living off its fat: plant was overloaded and there was only a small margin of safety in both generation and distribution, and, moreover, the increased costs of power stations were only gradually having an effect on prices. As costs came on, different retail tariffs would become necessary. Calculations made by his Board showed that the price/unit sent out would rise by about 30% in the next ten years, and then remain stable. We had to realise that electricity was the main physical thing in the world that could save this country.

MR. R. BIRT (N.R.E.I.C. and Southern Board) asked for close liaison between Area Boards and the Authority, so that a high power factor should be maintained. He felt that the whole power factor problem was still serious. In a similar way, he felt that every means of improving load factor should be developed, and in this respect he asked for investigation into ways of doing this on the consumer's premises, since the cost of providing 1 kW of supply there was about £100, while it could be avoided at a cost of £5/kW.

MR. R. H. RAWLL (L.E.B.) felt that we should try to simplify the economic problem in human terms—into how soon could Mrs. Brown expect to be connected, to have a cooker and to be supplied at a price which she could afford. In the old days pioneers in the industry fought for customers, knowing that prices tended downwards. Now the customers were waiting, but the prices were expected to rise. Part of the answer was for individuals in the industry to have a greater sense of responsibility, and he was glad that Sir Henry supported effective delegation of duties.

COL. B. H. LEESON (B.E.A.M.A.) spoke of the supply and manufacturing industries as partners, the first leading at home, the other in the field of export. The three main impediments to the wider use of electricity were suggested to be insufficient manufacturing capacity, the demands of the export market, and capital investment policy. Taking turbo-generating plant as an example, he said that capital to produce the machines was already invested, and that it had been based on the natural growth of the supply industry plus what the manufacturers thought they could get in the export field. The manufacturers had delivered 2,000 MW ex-works in 1949: 860 MW had been installed in British generating stations. Plant was not allocated to export—export orders had to be accepted and sought to keep manufacturing plant occupied. For 1953 exports would have to be increased unless the B.E.A. soon said that it wanted plant and would accept delivery.

He felt apprehensive about the Authority's capital policy after reading Sir Henry's paper: some form of stabilised programme was needed. It was impossible to run a long-term capital plant industry with control imposed from outside. The B.E.A. should compare the cost of idle plant in a power station, due to some items of equipment not being available, to the greater national cost of idle plant and work-people in factories if orders were not placed.

MR. E. C. LENNOX (North-Eastern E.B.) said that distribution to new housing estates cost £50/60/house. With houses using electricity for lighting only the revenue was perhaps £2/year from a house costing £1,300. Electric cooking would increase revenue to £10/year, but was often not installed because of the wiring cost, compared with gas. It might be sound economy to charge some of cost of supply to the housing authority and to use the income to finance wiring for cookers and water heaters.

MR. A. B. MACKAY (S. W. SCOT. C.C.) pleaded

Messrs. H. F. Brewer, R. H. Abell, M. Clissold and their ladies check with the inspector before the coach tour

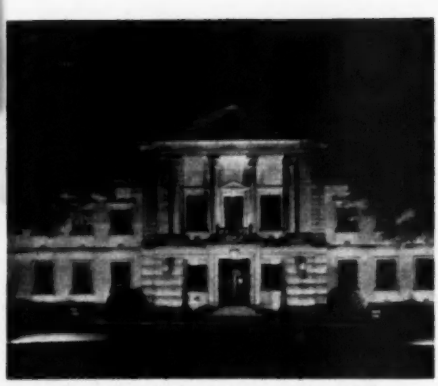
A further group of Wednesday afternoon visitors to the Yorkshire countryside

for relief for supply authorities from development charges, taxation, etc., which were incurred as a result of their good work.

MR. W. A. H. PARKER (N.R.E.I.C.) felt that we had only scratched the surface of the potential demand. The bottlenecks in realising the possible sales were lack of capital and the will to carry out this purpose. The general public was confused, and an objective review of the position was needed to gain their support. The rural customer was a special case and was worthy of consideration: the industrialist was at present financing the domestic consumer.

MR. H. F. DUBUIS (B.E.A.) queried whether it was right that a nationalised industry should make a profit: so far as the domestic supply was concerned the supply authorities were in the position of retailers, and perhaps a profit should be made to provide for the requirements of the future.

Sir Henry Self replied to the discussion at some length, referring particularly to Col. Leeson's remarks about the production of turbine plant. He said that in the case of some equipment, individual firms were behind their programme.



Municipal offices bathed in sodium light

DISCUSSION ON LIGHTING

MR. R. A. S. THWAITES (E.D.A. and N.W.E.B.) remarked that compared with the tantalum lamp, we were now getting 80 times as much light per lb coal, and enquired what factors delayed the development of the fluorescent lamp.

MR. R. BIRT (N.R.E.I.C.) asked about the power factor of fluorescent lamps, which he believed was about 0·3 lagging when uncorrected. The 8 ft 120-W lamp had a leading power factor; could not this be, with advantage, installed in factories to compensate for induction motor load?

MR. W. J. JONES (E.L.M.A.) commented on the great variety of development that had occurred in the discharge lamp field; it had surprised many overseas engineers, and fluorescent street lighting, for instance, was readily being accepted there. He suggested that restrictions in street lighting here should be lifted to permit wider application, so that our pioneering position can be maintained.

Turning to decorative effects, he asked that the work on coloured fluorescent lamps should be taken to heart rapidly so that effective displays can be arranged in time for the Festival of Britain. Finally, he emphasised the relative cheapness of electrically produced light—it was cheaper to burn a 60 W lamp for 10 minutes than to strike a match.

MR. G. F. MOORE (S.E. Scotland Electricity Board) asked if there was any prospect of the colour rendering of the sodium lamp being improved. He said that owing to the high efficiency of this lamp, it was being adopted by large numbers of street lighting authorities and recently in connection with a street lighting contract, the Board which he served had been informed that it was a condition of grant by the Ministry of Transport that the local authority must use sodium lighting. If there was no prospect of an improvement in colour rendering this seemed a retrograde step and, once installed, it would be impracticable to replace the sodium fittings for many years.

The AUTHOR, replying to the discussion, said the basic power factor of the fluorescent lamp itself was about 0·9 but when the inductance in the circuit was added, it fell to about 0·5. He did not know what progress could be made there except to make use of lagging as well as leading circuits, as Mr. Birt had implied. The 8 ft 120-W lamp gave a power factor of 0·75, consisting of a condenser and inductance in series rather than in the parallel condenser arrangement. His colleagues on the commercial engineering side could say better than he whether equipment was sold without condensers and without power factor correction, but he had thought that 98% of it had power factor correcting condensers permanently connected.

With regard to what had been suggested should be called the Davies lamp, he said this was the result of co-operative work in various laboratories.

Finally, in reply to Mr. Moore on the question of colour correction, he said the answer was definitely "No."

LORD CITRINE proposed the vote of thanks to the author.

Problems and Practice

IN ENGINEERING

Shocks from the Wall

A REPORT was sent in stating that a certain section of wall at the entrance to a doctor's surgery gave shocks on wet days. On investigation this proved to be correct and the offending piece of apparatus was found to be an outside light fitting of the normal type used both for lighting and indicating the entrance to the surgery waiting room.

The fitting appeared to be in good order and was very definitely earthed to the sheath of the lead-covered feed cable. Upon closer examination traces of moisture were discovered inside the metal lampholder and a Megger test showed a definite fault between live and the supposed earth.

The earth, when checked, appeared very unsatisfactory and eventually a metal joint box on the feed run was found to be without the usual type of metal clamp.

When the lampholder had been cleaned and made water-tight and the joint box made good, no further trouble was experienced.

During the wet weather the surrounding wall where the fitting was fixed became moist to within about two feet of the floor, which remained dry and, therefore, anyone touching the moist part of the wall, by virtue of standing on the wet footpath, completed the circuit and thus received an unpleasant shock.—*A.M.R.*

Armature moves on Shaft

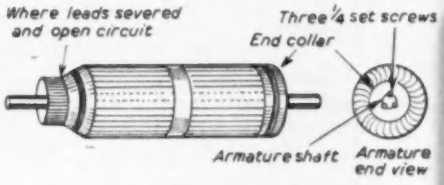
THE cross travel motor on a 5-ton d.c. crane was found to be sparking very badly and on dismantling, the armature was found to have an open circuit just behind the commutator where the leads were sweated in.

It was repaired and put into service again, but in about ten days the same thing happened, but a different lead this time. Again it was repaired and the same thing happened in a few days.

No spare armature was available so it was decided to very carefully check over the existing unit. This was drop-tested and found perfect and it had a good reading to earth.

The core was clamped in a vice and the commutator was tested to find if there were any loose bars, then it was noticed the whole commutator seemed to have a slight movement. A pair of Stilsons were gripped on the shaft and it was found that the shaft had a movement of about $\frac{1}{32}$ in. in the laminations, but the commutator was perfectly tight.

This meant that on starting and reversing the motor, the core and coils moved $\frac{1}{32}$ in. before the commutator and in time a coil lead (which was only 20 s.w.g.) was severed at the back of the commutator and an open circuit resulted.



Emergency fixing adopted for core plates

To strip the armature down and put in a new key would have hindered production so a quick method had to be adopted. The collar which supported the coil sets at the opposite end to the commutator (or the pinion end) was found to be tight with the laminations. So three holes were drilled half in the shaft and half in the collar. These were tapped and ¼ set screws screwed tightly home.

After 15 months, this armature was still in service and giving no trouble.—*M.F.P.*

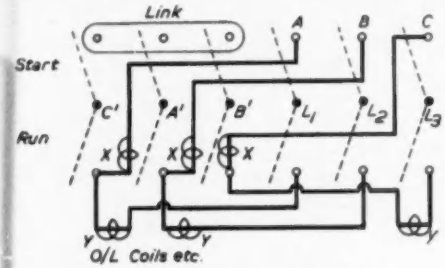
Galvanised Roof Danger

I WAS once called in to investigate the strange behaviour of a coal fired kitchen range in a bungalow as the cook complained of receiving shocks from the cooking utensils. The bungalow incidentally was roofed with galvanised sheeting. A check up of the installation revealed that a twin flexible cord with its conductors separated had been connected to a junction box for feeding a garden light. These conductors had been taken under the edge of the roof sheeting and due to uneven tension the insulation of one had been cut through, bringing the wire into contact with the metal. The damaged conductor being on the phase side, it was apparent that the leakage path to earth had been via the sheeting, kitchen chimney and range. The flexible cords were disconnected and removed. A new lead

of 3/0·029 two-core weatherproof cable was fitted up, cleated clear of the sheeting and tapped from a wall plug.—*W. H. Gatehouse.*

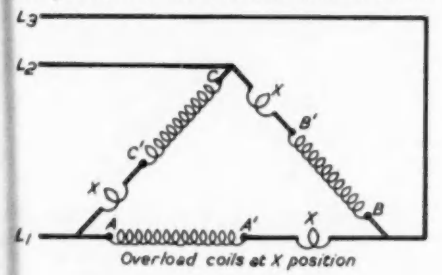
Conversion of Star-Delta Starter

FIG. 1 under the above heading in your issue of March 30, gives the "standard connections" for a star-delta starter. There are so many types of star-delta starter that to call one method of connection "standard" is misleading. However, the position of the overload coils in the circuit shown is, I am afraid, a

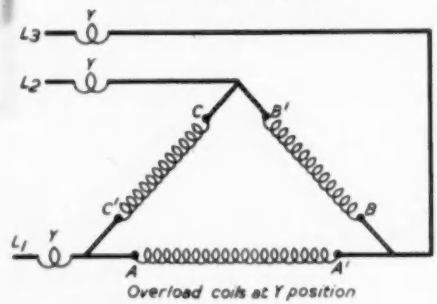


Alternative overload coil connections

"standard," but this is at last being modified by some manufacturers. The modification merely consists of putting the overload coils in series with the mesh, instead of in the lines (the position of the overload coils is shown



Overload coils at X position



Overload coils at Y position

Effective overload coil positions

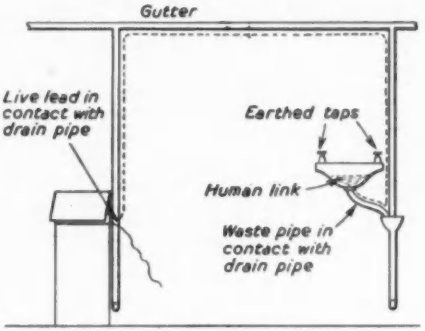
herewith) but such are the advantages that one wonders why this has not been made "standard" long ago.—*R. A.*

Bathroom Shocks

A CONSUMER complained of receiving electric shocks off bathroom wash basin taps. Investigations showed that all water pipes were dead, that the continuity of the pipes was good, and in contact with earth. The problem was complicated by the fact that this phenomenon was not always present. The house wiring was examined and tested and found all in order and nowhere in contact with water pipes.

What was the answer?

The diagram will provide it. An inventing boy living next door had run a lead from the house to his shed. This was flex of very poor quality, and *en route* was touching the roof drain pipe. This livened up the guttering along the two houses and the down pipes of the house in question. The bathroom sink lead waste


Gutter
Live lead in contact with drain pipe
Earthed taps
Human link
Waste pipe in contact with drain pipe
Dry brickwork insulated drainpipes from earth

Circuit for intermittent shock

pipe was touching the down pipe at the funnel, hence this was alive. The porcelain sink insulated the taps (i.e., earth connection) from the live waste pipe and the shock was got through the water in the basin by the action of using one hand to turn the tap and the other to feel the water, the shock being received through the two arms and across the body.

This case illustrates the complicated issues brought about by irresponsible actions, and I trust will be of interest and usefulness to those engaged on these sorts of jobs.—*F. J. Pryor.*

Contributions to this page, dealing with specific problems and items of interest to practical engineers are welcome, and will be paid for at our standard rates. Items should be brief, and preferably written on one side of the paper.

The Royal Show

Record Number of Exhibitors marks this Year's Show at Oxford

EACH year the most noticeable feature of the Royal Show, Britain's principal agricultural show, is the increasing number of implements and machinery which have been designed or adapted for electrical operation.

Without doubt, a direct result of E.D.A.'s work and that of the area electricity boards is an increasing consciousness, among farmers and their kinfolk, of the overall efficiency and cleanliness of electricity as a source of power.

This factor is, perhaps, most important in dairy farming, with the attendant advantages of milk-cooling refrigeration and sterilisation, but the discerning farmer has not overlooked the importance of electricity in lighting his farm buildings and providing ample power "on tap" for the many heavy jobs which form the, perhaps, not so attractive part of the farming way of life.

Interesting statistics show that trade and implement exhibitors from every county of England, from five Welsh and ten Scots counties, have displays at Oxford, where the total of 730 stands is a record for the Royal Show.

Perhaps the most complete and interesting example of the advantages of electricity to the farmer is "Electricity Farm", the joint exhibit of the Southern Electricity Board which serves the Oxford area and the Electrical Development Association.

The exhibit, presenting the natural appearance of a group of farm buildings, includes a two-storey Colt timber house which will house along with the other buildings a variety of equipment to prove the versatility of electricity in providing for the needs of the progressive farmer.

The Colt house is used as an inquiry centre, while a dutch barn—apparently stacked with hay—will be the nerve centre of the whole electrical exhibit. Other buildings are standard Ministry of Agriculture steel frame buildings and a two-storey timber barn, the latter containing an electric sack-hoist, complete hammer-mill installation with grain elevator and storage bins, and a feed mixer.

In the dairy building is housed a milking parlour with an electric tandem high-level milking installation, a producer and a producer-retailer dairy, and farm water supply equipment—all working installations. The poultry building includes heaters, brooders and incubators, egg cleaners, poultry pluckers and examples of special lighting for increasing egg yield.

In the workshop section of "Electricity Farm," demonstrations are given of electric arc-welding, and on show is a wide range of electrically-operated wood and metal working tools, including a bench drill, portable grinder and sander, portable drill, soldering iron and a planing machine.

Barn machinery is illustrated in a number of striking displays, including one dealing with the variety of electric drives available for farm machinery, and there are working exhibits demonstrating crop treatment and the principle of pneumatic grain conveying and elevation.

The farmer's home and the farmer's wife are considered as important as the farm, and in the domestic section there is a selection of appliances to make life easier including, cookers, water heaters, refrigerators, vacuum cleaners, washing machines, irons, and kettles.

A special attraction of "Electricity Farm" which, no doubt, is appreciated by the visitors, is the garden feature, contributed by the City of Oxford Parks Department.

The visitor to the trade and implement section of the show will be able to see the various makes of equipment and compare their respective values, whilst the attendant sales representatives will be ready to answer his enquiries.

There are displays which we think the farmer can ill afford to miss, so following we present details of these exhibits in alphabetical order.

Auto Diesels Ltd., Stand 473. Exhibits include a selection of smaller models from their range of self-priming centrifugal pumps and units from the range of low-price diesel-engined farm lighting equipments.

Barford (Agricultural) Ltd., Stand 469. Special attention should be paid to the electric sterilizing chest and the bottle washers exhibited. Electric water heaters are another speciality of the firm.

James Beresford and Son Ltd., Stand 529. "Beresfords" means first-rate pumping equipment in the engineering world. Visitors to this stand will see why this is so! Centrifugal, submersible, sump and portable pumps are displayed.

A. B. Blanch and Co. Ltd., Stand 556. The electrically powered Universal elevators are interesting. The firm is again showing the Blanch-Electrix butter-making equipment which had such a good reception last year.

The British Vacuum Cleaner and Eng. Co. Ltd., Stand 702. Main display here is the industrial vacuum-cleaning equipment. B.V.C.'s sack cleaning plant will interest the farmer and his wife will be attracted by the many "Goblin" home appliances which include washing machines, vacuum cleaners, tea-making sets, irons and clocks.

Brook Motors Ltd., Stand 324. Being shown for the first time are the new downdraft drip proof motor, ideally suited for damp surroundings in the farm,and a useful f.h.p. grinder with tool rests. Six new automatic push-button operated starters for single- 2- and 3-phase current are available for demonstration and the displays are backed up by a show of electric motors of various sizes.

C.A.V. Ltd., Stand 308. Agricultural tractors and the power plants on a farm could not operate efficiently without first-class fuel rejection equipment and the ancillary electrical equipment such as starters, control boards, lamps, batteries. C.A.V. have, for years, specialised in this equipment and on their stand can be seen the results of years of research and development.

Cooper Stewart Engineering Co. Ltd., Stand 537. Sheep shearing machines, dehorners, fencing units and the electric animal coaxer produced by this firm are now well-known amongst farmers. Displayed are the latest patterns.

Crompton Parkinson and Co. Ltd. The exhibit of this company is perhaps unorthodox for it includes 5,000 yd of 4-core medium voltage D.S.T.A. cable and high-voltage switchgear for the main substation. Without these "unseen" exhibits the Royal Show would not enjoy its usual success.

Curfew Appliances Ltd., Stand 312. Poultry farmers know the quality of Curfew appliances. This year's display includes electric hovers and foster-mothers. Conversion units for incubators and brooders. New items are the tray washing machines and the egg fumigating cabinet.

English Electric Co. Ltd., Stand 116. Transformers, switchgear and electric motors are important on the up-to-date farm and "English Electric" is a name which means trouble-free service for a long period. The company's washer, the refrigerator and a display of their cookers will attract the farmer's wife.

Frigidaire Division of General Motors Ltd., Stand 275. The type DE30 combined water and direct expansion surface type cookers for raw and pasteurised milk are interesting from the dairyman's angle. Many other Frigidaire refrigerators and allied equipment are displayed.

Gascoignes (Reading) Ltd., Stand 466. During recent years this company has made very substantial advances in the design of milking equipment and amongst their many products on show are auto-recorders, the Mobilactor, the Mobilette and the Miracle milkers, the Grubtruk, the Gascoignette milker and the Stimulactor trolley. No dairyman can afford to miss this display.

General Electric Co. Ltd., Stand 410. Latest advances in G.E.C.'s range of farming apparatus are being shown. Amongst these are the new 20-gallon dairy water heater with a loading of 1 kW, and the new G.E.C. soil sterilizer with plate-type resistance heaters. A prominent feature of this year's display is the range of G.E.C. batteries and Woods aerofoil axial flow fans for use in grain drying.

Harvest Saver and Implement Co. Ltd., Stand 423. The "Robust" universal cutter and chopper made by this firm is available in three models with 5, 10 or 15 h.p. electric motor drives and provides facilities for better feeding, ensilage artificial drying and better humus.

Harvey Laying Battery Co. Ltd., Stand 292. Prime exhibit is the Harvey automatic laying battery, a small unit comprising 72 cages and powered by a $\frac{1}{4}$ h.p. single-phase motor. Food, water and grit trough are conveyed round the battery on a moving carriage, introducing the cafeteria system of feeding in these laying batteries.

Hoover Ltd., Stand 261. Entirely new fractional h.p. motors are being displayed for the first time at the Royal Show. They have a variety of uses and are interchangeable with earlier models. Hoovers' low price washing machine and the Hoover cleaners are also shown.

W. L. Holland Ltd., Stand 536. "Adelphi" mixers and shredders are supplied in a variety of types and sizes and make fodder problems insignificant and are displayed here.

International Refrigerator Co. Ltd., Stand 99. Milk cooling equipment, coldrooms and refrigerators bearing the name "Coldrator" are efficient units giving trouble-free service. A visit here is essential.

Geo. W. King Ltd., Stands 189 and 297. The "Cyclonic" grain conveyor, a portable electro pneumatic unit served by a 4 h.p. motor, a heater unit and the "My Te Min" chain pulley block are main electrical exhibits on this stand. The firm are well-known material handling specialists.

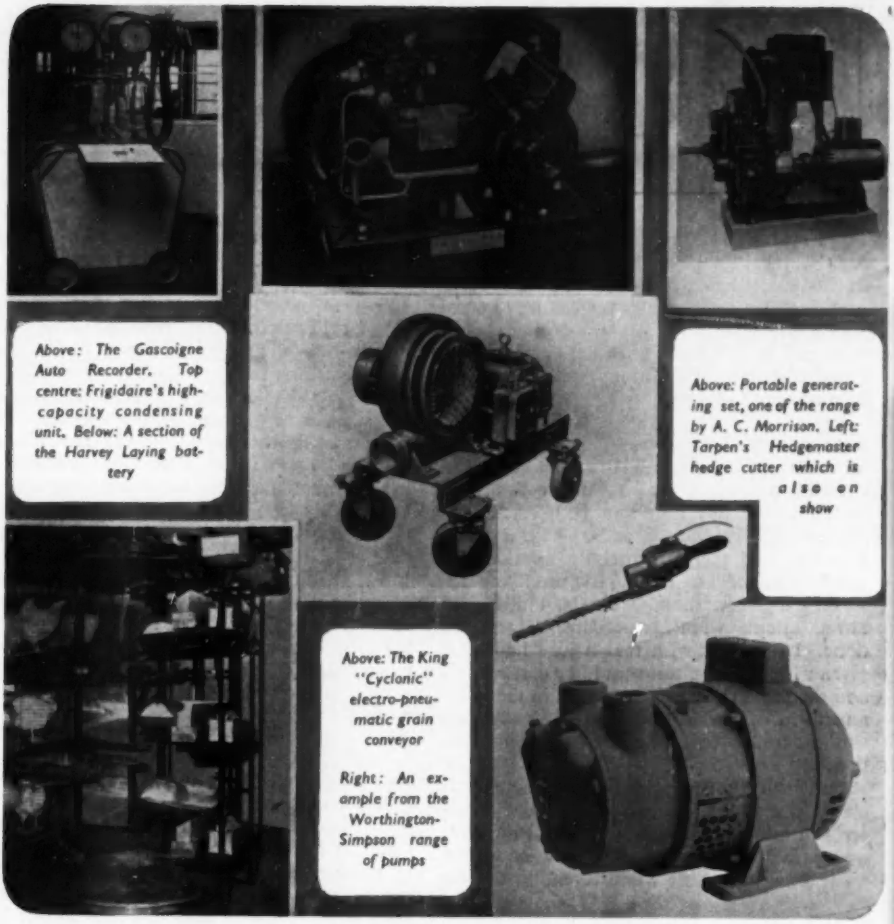
Lee Howl and Co. Ltd., Stand 488. The company are exhibiting a selection of their range of electrically driven pumps. There are many of these electrical units in operation on the stand.

R. A. Lister and Co Ltd., and Blackstone and Co. Ltd., Stand 476. A wide variety of engines, generating sets, pumping equipment, sheep shears, and dairy equipment are featured by the company. The new List T.T. Streamline milk cooler should not be missed by any farmer.

Max-Arc Welders Ltd., Stand 636. The "Max-Arclette," the larger "Max-Arc" welder and an engine-driven arc welding set are displayed. These are of particular interest to the rural craftsman.

A. C. Morrison (Engineers) Ltd., Stand 543. A range of generating plant supplying standard mains current to the farm and water pumping equipment now available, operating on the jet principle, are displayed. This latter idea dispenses with the need for submerged motors, pistons or cylinders, and is of particular importance now that the Government aids farmers in laying in water mains, etc.

Penney and Porter Ltd., Stand 500. The 2-ton grain drying plant with pre cleaner and the "Winnograder" displayed here can be operated by electricity and make light of many farm labours.



Above: The Gascoigne Auto Recorder. Top centre: Frigidaire's high-capacity condensing unit. Below: A section of the Harvey Laying battery

Above: Portable generating set, one of the range by A. C. Morrison. Left: Tarpen's Hedgemaster hedge cutter which is also on show

Above: The King "Cyclonic" electro-pneumatic grain conveyor

Right: An example from the Worthington-Simpson range of pumps

Perkins Clean Milk Equipment Ltd., Stand 160. The "Power" electric boilers and "Producer" electric sterilising outfits are essential to the modern dairy farm. These with other equipment are shown by the company.

Philips Electrical Ltd., Stand 58. Welding transformers and electrodes, battery chargers and fault finders are shown by the company. All are essentially in the complete farm workshop.

Pressed Steel Co. Ltd., Stand 409. In the "Showmobile" exhibition vehicle, much of the equipment produced by the company is displayed for the attention of the dairy farmer. A new model of interest to the smaller dairyman is the Prestcold "Cowley" with cooler.

Ransomes, Sims and Jeffries Ltd., Stand 439. To be seen here is the 18-in. Rowlic electric lawn mower which makes light work of a major backaching task.

Tarpen Engineering Co. Ltd., Stand 557. Equipment displayed includes Tarpen portable generators, the tea-plucking machine and the Tarpen "Hedgemaster."

Visi-Chick Brooder Co. Ltd., Stand 79. Nursery brooders, pens, the Visi-Sunray electric brooder and the electric heating unit form centre point of this display.

J. W. Wooley and Co. Ltd., Stand 115. The "Electrobloc" steam raiser supplied in various sizes and ratings is most interesting from the dairyman's angle.

Worthington Simpson Ltd., Stand 647. New motor-driven "Domestic" self-priming pumps designed especially for agricultural communities are being exhibited at the Royal Show for the first time.

Notes on Wiring
by MEGOHM

Circuit Conductivity

Some Practical Difficulties of Testing Discussed

CONTINUING my observations on the 12th edition of the I.E.E. Regulations, an interesting addition is the new clause 1106(B) in the section dealing with the testing of completed installations. This prescribes that a test shall be made to verify the continuity of every ring circuit used in connection with the 13 amp fused socket outlets.

Exactly how this test is to be carried out is not specified, but obviously the committee had in mind the possibility of a break or bad connection somewhere in the conductors, which would not normally be disclosed in a circuit fed from both ends. With a break near one end there might be a considerable overloading of the cable, and in many instances this condition would be unlikely to attract attention until some damage had been done. I therefore wish that a lead had been given as to how the test should be carried out, and the same considerations arise in fact with any form of ring circuit or where mains are run in parallel to feed any part of an installation.

Continuity tests of conductors is actually a useful precaution, though not officially prescribed, and very seldom carried out on ordinary installation work. It might be worth while to give a little more attention to this matter.

Low Resistance Values

The trouble is that unless the tests are carefully made with accurate, first-grade instruments, then the results may be very misleading due to the low resistance values involved. Again, with poor joints, if the conductors have been cut at the points where they are looped, the figures may vary as between those obtained at no load and full load.

In a ring circuit wired with 7/·029 in. cable the average length of the whole circuit will probably be some 50 to 100 yards which gives us a resistance of $\frac{1}{4}$ to $\frac{1}{2}$ ohm for each conductor, and correspondingly less as the size of the cable is increased. The ordinary conduit continuity tester, although it will show up an open circuit, may not be accurate enough for our purpose, though more delicate instruments are available, as for example the Hum Metrohm produced by Everett Edgecumbe and Co. Ltd. This firm incidentally attach a small instruction label to each tester, indicating briefly the results that should be obtained for various tests according to regulations, and have added to this that the resistance of each conductor of a domestic ring main, before the ends are jointed at the fuseboard, should not exceed 0·3 ohm. This is a step in the right direction.

Most manufacturers of socket outlets, I believe, have so arranged their terminals that it is unnecessary to cut the conductors at each take-off point, but for convenience in getting just the right amount of slack in each box, and at those points where spurs are taken off, I feel that many wiremen will cut the cables and twist the ends together before clamping them in the terminals.

Types of Test

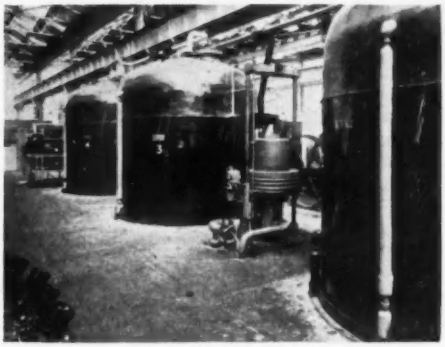
It is a comparatively simple matter to devise laboratory tests for continuity and current carrying investigations, either based upon millivolt drop or temperature rise, or a combination of the two. But neither of these methods lends itself readily to investigations at a large number of points in a modern installation. As an example of the values involved, for the 5 amp tumbler switch to B.S.S.1299 the voltage drop between the terminals at full load must not exceed 75 mV and the temperature rise 15° C, and for the contact between a socket contact and a plug pin of socket outlet to B.S.S.1363, the corresponding values are 12 mV and 35° C at 13 amps respectively.

Pending, therefore, some further official pronouncement on the manner in which the conductor continuity tests should be carried out, and if they should be extended to other circuits than those in connection with ring mains for socket outlets, I imagine that most people will rely upon the visual examination of all joints and connections, coupled with a general investigation on purely empirical principles, for the location of poor conductivity.

The Impregnation of Super-Tension Cables

Degreasing is included in Henley's new plant

IMPREGNATING plant installed at the Gravesend works of W. T. Henley's Telegraph Works Co. Ltd. since the end of the war has several interesting features. In the first place, limitations of headroom necessitated a large portion of the plant being sunk below ground, and the excavation of the two pits, one 94 ft by 36 ft by 9 ft deep and the other 20 ft by 10 ft by 14 ft deep, required the removal of some 2,000 tons of chalk without interrupting normal working of the factory.



The compound storage vessels together with the hydraulic accumulator

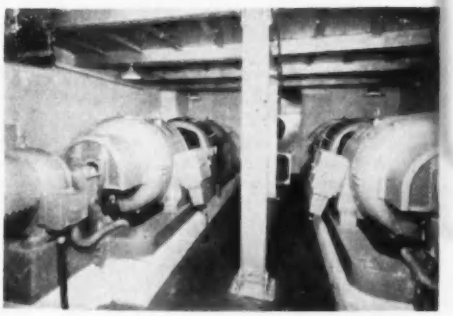
Impregnating Vessels

There are four main vessels each 11 ft internal diameter and 13 ft 11 in. high, with a central dome 5 ft diameter and 9 ft high, to reduce the volume of compound required, which is still, however, in the region of 20 tons per vessel. Tests carried out included vacuum tightness to a maximum of 1 mm Hg after twenty-four hours, and pressure tests to 100 lb/sq in. on the vessel and 150 lb/sq in. on the jacket. Oil seals are used for the lids, the plant requiring about one ton of oil for this purpose.

The cables are loaded in annular trays and heat is applied both externally by steam-jacketing and internally by passing current through the cores. For this purpose there are two motor-generator sets each consisting of a 350 h.p. 6·6 kV synchronous motor coupled to two generators rated 0-200 volts 600 amps. For the production of the vacuum, while drying is in progress, reciprocating "rough" pumps are provided with a rotary type final pump for each vessel.

The main impregnating vessels

Compound arriving in the factory is pumped to a waiting tank then, after laboratory tests, to a 50-ton storage tank from which it is pumped to the plant vessels (similar in appearance to the treatment vessels) through a filter capable of retaining particles down to colloid size. Facilities are provided for sampling compound at various stages of the process. A hydraulic accumulator is provided for maintaining a static pressure of 40 lb/sq in. during the impregnating period.



Motor-generator sets supplying current for heating cable cores

Degreasing plant is provided to ensure that the trays used for loading the cable are clean and dry before being used again.

overseas news

Swedish Visit

Electric power technique in Sweden, including the latest developments in the field of transmission, were, at the invitation of Sweden's Board of Waterfalls, studied by a group of engineers comprising five from the United States, four from Canada, and three European E.C.A. representatives, earlier this month. Visits were made to many of the Board's power schemes, and to factories of A.S.E.A. and other concerns.

Collie Power Award

The Collie Power Co., Ltd., was awarded over £300,000 by a compensation court earlier this month in its claim against the Western Australian Government for compensation for acquisition of the company's undertaking in October, 1946. The company claimed £577,430, and the Crown offered £128,097, which was increased to £134,458 during the hearing of the case, which occupied the Court for nine days last November. The Court awarded £288,750 and gave the Government the option of paying to the company the net profits received by the Government or paying interest at 6% per annum on the sum of £288,750 from the date of acquisition. Costs were also awarded to the company.

N.S.W. Order

An order for two 2,500 kW steam turbine-driven alternator sets with condensing plant, switchgear and spares, has been placed by the Ulan County Council, New South Wales, with Coates and Co., Pty., Ltd. The contract price is £A128,256. The plant will be manufactured by W. H. Allen, Sons and Co., Ltd. The Ulan County Council was formed recently to generate and distribute electricity from the Ulan coalfields near Gulgong in the central west of New South Wales. Donoghue and Carter, of Sydney, are the consulting engineers to the Council.

Commission's Acquisition

This month, the State Electricity Commission of Western Australia has taken over the operation of the Bridgetown electricity undertaking from Mr. G. H. Randell, who had been the concessionaire since 1924.

Problem at Newcastle

The Newcastle (N.S.W.) Chamber of Commerce is to make a further request that grit arresters should be fitted at the Railway Department's Zara Street power station. Previous requests have met with little success, the Minister of Transport, Mr. O'Sullivan, having pointed out that apart from the financial aspect, materials for the arresters were difficult to obtain. And because the boilers in the Zara Street station would probably not last more than a further six years, he doubted the advisability of fitting arresters, the capital cost of which he estimated at £60,000.

Australian Television

It is understood that the Australian Federal Government will shortly invite private concerns to help develop television broadcasting in Australia. The Government will be prepared to license private concerns to operate television stations. This Cabinet decision will reverse the Chifley Government's decision to retain television as a monopoly of the National Broadcasting network. The new arrangements in Australia will be similar to those in Canada. Because of the limited number of channels available in Australia, the Commonwealth Government is certain to limit the number of licences to private enterprise. But national and private stations will work side by side in developing television. To ensure that standards are maintained, the Australian Broadcasting Control Board will control television.

Tunnel Scheme Starts up

Premier Frost, of Ontario, officiated at the formal opening ceremony of the Tunnel power scheme of the Hydro-Electric Power Commission of Ontario on June 14. Describing the $17 million project as a masterpiece of engineering and workmen's skill, he said the 56,500 h.p. developed would provide tremendous stimulation to mining, agriculture, and the tourist industry. It would enable the iron ore resources of the area to be worked. Construction of the Tunnel project on the Mississagi River began in September, 1947. Power will be transmitted to Sudbury over a 115 kV transmission line, 132 miles long.

Underground Work in B.C.

Completion of the first stages of an underground power distribution scheme in the Kerrisdale and Point Grey areas, at a cost of $350,000 was expected in October, Mr. Ingledew, vice-president and chief engineer of British Columbia Electric Railway Co., stated recently. This is the undertaking's largest suburban project to date, some 175 miles of underground cable being involved. He said they were anxious to put all their power lines underground, but to do so was only economically feasible in certain areas.

Portuguese Cable

Cable manufacturers in Portugal have asked the Government to reduce Customs duties on imported wire for the cable industry, as at present imported wire is practically as expensive as the finished cable. According to the owner of the Portuguese firm "Quintaw Quintas," steel cables made in Portugal are not inferior to foreign products, but unless some action is taken by the Government to protect the industry against high prices asked for wires not made in Portugal, manufacturers will have to suspend operation shortly.

Plant for Spain

In the face of world-wide competition, the Metropolitan-Vickers Electrical Co. Ltd. has been successful in securing a large contract for the supply of hydro-electric machinery to the Saltos del Sil, S.A., undertaking for the San Esteban power station on the River Sil in north-western Spain. The project envisages the installation of four 90,000 h.p. generating units, the initial order comprising three generators, together with the necessary power transformers and switchgear. The value of the electrical portion of the contract is in excess of £1,300,000. The contract for the hydraulic turbines has been obtained by the Swedish concern, Aktiebolaget Karlstads Mekaniska, Werkstad.

An Afghanistan Scheme

Work has commenced on the hydro-electric scheme at Sarobi, Afghanistan, some 57 miles east of Kabul. A provisional contract for the supply of the necessary plant has been placed with the German firm, Siemens Schukert. The Mayor of Kabul, who is also manager of the Electric Supply Co., is a German-trained engineer. It is reported that when returning recently from a visit to Germany, while in Herat on his way back to Kabul, he examined a promising site for a hydro-electric station which could provide a supply for Herat.

Analyser for Bangalore

An a.c. network analyser is shortly to be installed at the Power Engineering and Electrical Technology Department of the Bangalore Institute of Science.

Indian Railways

Improvements to existing railway workshops in India are under way, while proposals to electrify a total of 1,320 miles of track near the ports is being considered by the Government. The subject of electrification, however, is linked with the availability of power from the various hydro-electric projects, temporarily shelved due to financial stringency. It is reported that the G.I.P. Railway, Bombay, has just finished construction of a double-decked train for suburban electric services.

New Line to Uitenhage

One of the biggest distribution power extensions ever undertaken by the Port Elizabeth city council—the new Port Elizabeth - Uitenhage power link—was inaugurated earlier this month. Cost of the scheme was £56,000. The link is 13 miles long and involves 168 spun concrete poles and two terminal towers. It will give an immediate 50% increase in capacity, and is designed to enable the present voltage of 22 kV to be stepped up to 66 kV. Port Elizabeth has supplied power to Uitenhage since 1929.

Bulawayo Development

There were 5,880 electric cookers in operation in Bulawayo in April last, according to the city electrical engineer's report to the city council. The number of water heaters totalled 3,963, and 2,068 refrigerators and 191 washing machines were also in use.

Atomic Power Proposal

The suggestion that U.S. industry should be allowed to build and manage its own atomic power plant with Government-leased uranium, has been made by Dr. C. A. Thomas, vice-president of the Monsanto Chemical Co. He suggested that initially a $35 million power plant should be established in Idaho to help to produce phosphorus at a profit, while supplying the Government with plutonium bomb material. He suggests the building by industry of a 75,000 kW atomic power plant in the mountains of Idaho, which are rich in phosphates but scarce in power. The United States Atomic Energy Commission would lend or lease uranium fuel under a 10-year contract.

Seattle Tenders Again

Following the intervention of the Economic Co-operation Administration, the city of Seattle has withdrawn its proposed ordinance which provided that tenders from firms other than American should not be accepted unless there was a reasonable difference in price (defined as a 25% higher figure). As a result the Municipal Council of Seattle has now invited British and other foreign firms to submit bids for the supply of two 40,000 kW transformers. The city purchasing agent has stated that there will be no bar against foreign bids, but he has made it clear that to be awarded the contract, a firm must offer a 100% performance bond to guarantee that the equipment was satisfactory. The equipment would also have to have American standard threads, with insulators or bushings interchangeable with those of the General Electric of America. It will be recalled that some five months ago, the tenders of Ferranti Ltd., and the English Electric Co., Ltd., were rejected, although their prices were considerably lower than the American offers, the reason given being that the British firms failed to meet the technical specifications.

PERSONALITIES

IN THE INDUSTRY

After 50 years' service with Berry's Electric Ltd., **Mr. W. H. Hoare** has now retired. Although he was associated with other departments, he was chiefly responsible for the switchgear and switchboard section in London and the south of England, which had always been under his management. He was for many years London branch manager, and was also the company's representative in the Electrical Wholesalers' Federation and in the S.S. and F.G. Section of B.E.A.M.A.

Mr. W. H. Hoare

The Brazilian Traction Light and Power Co. Ltd. announces that **Mr. H. B. Style,** who has been the senior executive of the organisation in Brazil, has tendered his resignation and that the Board of Directors has with much regret accepted it. **Mr. J. McKim Bell,** who has been with the organisation in Brazil for many years, will take over Mr. Style's duties and responsibilities.

At the end of July **Mr. S. R. Siviour,** O.B.E., M.I.E.E., retires from the position of chief engineer to the Yorkshire Electricity Board, and will be succeeded by his present deputy, **Mr. J. D. Nicholson,** B.SC., A.M.I.E.E. Mr. Siviour went to Yorkshire in 1911, after early training at Croydon and with Callender's Cable and Construction Co. With the Yorkshire Electric Power Co., he was appointed mains construction engineer in 1922, holding that position until the end of 1947, when he became deputy general manager of the company. He is a past chairman of the I.E.E. Transmission Section and of the I.E.E. North Midland centre. Mr. Siviour is a member of various technical committees of the B.S.I. and of the E.R.A., and also a member of the British National Committee of the C.I.G.R.E. A well liked and respected personality, Mr. Siviour will be missed at future electrical gatherings. His successor, Mr. Nicholson, prior to joining the Yorkshire Board early last year as deputy chief engineer, was section head (engineering), planning and development, with the South-West Scotland Electricity Board. Earlier, he had been in charge of planning and development of the grid system in the Yorkshire area, having served with the C.E.B. Central and South Scotland areas since 1932. His early experience was gained at the Pinkston power station, Glasgow.

Mr. S. R. Siviour

Mr. J. D. Nicholson

Mr. T. Nolan, A.C.I.S., accountant, No. 4 sub-area, Yorkshire Electricity Board, was elected to the Executive Council of the Association of Local Government Officers at the conference recently.

Ekco-Ensign Electric Ltd. have appointed **Mr. C. Stuart,** A.M.I.E.E., as lighting engineer for Scotland, and he will operate from the company's Glasgow office at 26 India Street. Mr. Stuart, who served an apprenticeship with Wm. Denny Bros. Ltd., Dumbarton, has until recently been with the Scottish Area organisation of Philips Electrical Ltd.

Mr. C. Stuart

Earlier this month, **Mr. A. W. Cale,** manual personnel officer to the London Division, B.E.A., retired. He started with the London Power Co. in 1926. His successor is **Mr. A. Anderson.**

At a recent informal ceremony at Henley's Cable Factory at North Woolwich, two veterans, each with over 50 years' service to their credit, were presented with framed engrossed copies of resolutions expressing the company's gratitude for their long and loyal service. Both of these employees, **Mr. A. H. Hinds** and **Mr. W. Killan,** were congratulated by Sir Montague Hughman, chairman of the Henley Organisation, who made the presentations on behalf of the board.

A slip occurred in our note last week concerning **Mr. F. W. Smith,** which may have been spotted by many readers. He is, of course, the new *chairman* of the A.S.E.E., **Mr. T. G. N. Haldane** being the new president, as we recorded.

Clang Ltd. have appointed **Mr. W. D. Watts,** of 53 Canford Lane, Westbury-on-Trym, Bristol, as area representative for South Wales and the West Country, including Hants, Berks and Oxon.

At the end of this month, **Mr. K. Oldham Smith** is leaving R. W. Gregory and Partners to take up the position of assistant technical and electrical engineer with the Air Ministry at Area Headquarters, Long Barton, Newcastle.

Senior lecturer in electrical engineering at Wigan and District Mining and Technical College, **Mr. H. J. E. Anscombe,** B.SC.(ENG.), A.M.I.E.E., A.M.I.MECH.E., has secured the post of head of the mechanical and electrical engineering department at Constantine Technical College, Middlesbrough. Mr. Anscombe served a student apprenticeship with the English Electric Co. Ltd., with whom he was employed as a switchgear engineer from 1936 to 1938. In the latter year he became lecturer in electrical engineering at Brighton Technical College, going to Wigan in 1946.

Mr. N. C. Hodson of the Maxlume Lighting Section of Veritys Ltd. has been appointed a director of the company.

Mr. B. R. Sankey

Formerly acting managing director, **Mr. B. R. Sankey,** A.M.I.E.E., has now been appointed managing director of the International General Electric Co. of New York Ltd., in London. He served an engineering apprenticeship with the B.T.H. Co., and was later engaged on general engineering and construction work in South Africa before joining the International G.E.C. in 1925.

Mr. E. Hughes, D.SC., PH.D., M.I.E.E., is retiring in August from the Headship of the Electrical Engineering Department of the Brighton Technical College, and is being succeeded by **Mr. W. A. Turner,** B.SC., A.M.I.E.E., at present senior lecturer at the Northampton Polytechnic, as we exclusively reported on May 11. Dr. Hughes received his technical education at the Heriot-Watt College, Edinburgh, and served his apprenticeship with Crompton and Co., Chelmsford. After a period in the Design Office of the General Electric Co., Witton, he was appointed lecturer at the Heriot-Watt College. He joined Brighton Technical College in 1919. Of his many papers on original research, eight were published in the *Journal* of the I.E.E., and a Premium of the Measurements Section was awarded for a paper on "A.C. Characteristics of Nickel-Iron Alloys." Dr. Hughes has just published a textbook on "Applied Electricity," and is joint author with Dr. A. Morley of three volumes on "Engineering Science." From 1939 until 1946 he was an examiner in electrical engineering for the University of London, and is at present one of the Moderators of the University in this subject.

Mr. R. P. Raikes

Marconi's Wireless Telegraph Co., Ltd., has appointed **Mr. R. P. Raikes** as publicity manager, in succession to the late Mr. W. G. Richards. He joined the firm last year as deputy publicity manager.

Mr. E. W. Thompson, M.A., chairman and joint managing director of John Thompson Water Tube Boilers, Ltd., has been elected to the Council of the British Engineers' Association.

Shift charge engineer at Kirkstall power station, Yorkshire Electricity Board, **Mr. D. Hudson** has received H.M. the King's commendation for brave conduct at the station. The incident occurred in 1948, when a transformer explosion shut down the station and started a fire, three men being blown from a platform. One of the men, who died later, lay saturated in oil, and with his clothing burning. Mr. Hudson dragged him clear, and tore off his overalls, receiving severe burns to his hands. He then groped his way to emergency switches, restored a supply, and made arrangements for the two men to be taken to hospital.

A picture on page 1037 of last week's issue included **Mr. C. H. Hughes** of Siemens Electric Lamps and Supplies, Ltd., and not Mr. H. A. Deacon, as stated.

Mr. G. H. Thompson, vice-president of the Montreal Engineering Co., was elected president of the Canadian Electrical Association at the sixtieth annual meeting of the Association a few days ago.

Tomorrow, June 30, sees the retirement of **Mr. L. Ashman,** senior traveller in the London area for the General Electric Co., Ltd. He joined the firm in 1901, serving in various departments before leaving the company in 1904. Two years later he returned, spending a year in the fittings department and seven years in the dispatch department, before transferring to the London sales department in 1914. After war service he returned to the company, and was appointed to his present position in 1938. His successor is **Mr. B. E. Crow.**

Mr. L. Ashman

OBITUARY

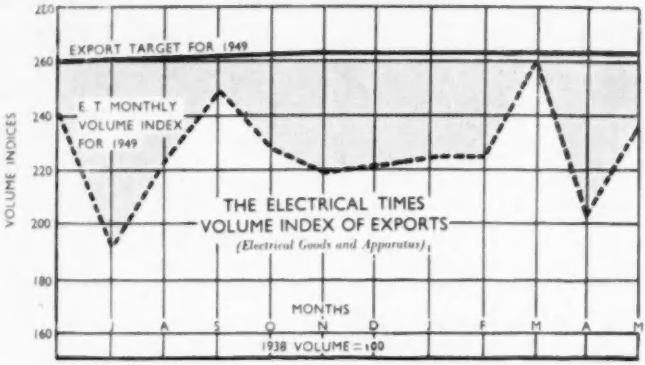
The death occurred on June 18 of **Mr. A. C. Kington,** area chief contracts engineer, Scotland, to British Insulated Callender's Construction Co.

EXPORTS AND IMPORTS

EXPORT VOLUME INDEX

Trade returns for May show that £6,706,386 was the value of the electrical goods and apparatus exported during the month. This was equivalent to 236% of the 1938 achievement, and an improvement on most recent figures.

As announced in our columns last week, the Board of Trade have selected a new base year for measuring trade, and to conform with this alteration the accompanying graph will no longer be produced in its present form.



ELECTRICAL goods exported during the month of May showed a welcome increase of £1,935,575 over the figure for April, and were only £795,841 in value short of the record total achieved in March last. The most notable increases occurred for such items as wireless apparatus, stationary accumulators, house service meters, and, of course, the convertors, transformers, rectifiers, etc., group. It is worth noting that in last month's figures for the latter goods, exports of transformers amounted to £609,210, switchgear and switchboards totalled £939,000 and motor starters and control gear £193,447 Of all the electric cooking and heating appliances exported, flat irons alone accounted for £37,866, compared with £38,961 in April, £49,861 in March and £34,963 in February.

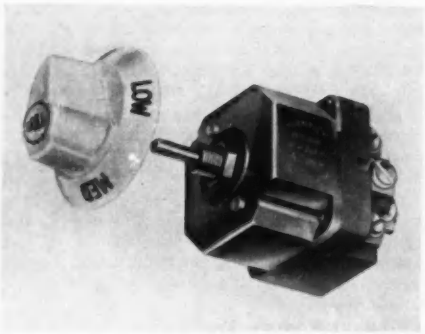
Last month Australia took electrical goods to the total value of £1,290,460, while corresponding figures for other countries were, South Africa £1,015,305, India £968,258, New Zealand £548,624 and Canada £338,935.

Description	Exports Value Month of May			Imports Value Month of May		
	1948 £	1949 £	1950 £	1948 £	1949 £	1950 £
Telegraph and Telephone Wires and Cables—						
Submarine	144	240,203	66,307			
Other	514,629	609,487	626,248	7,325	3,357	5,281
Rubber Insulated	420,299	489,638	286,036			
Insulated, other than Rubber	833,572	1,161,689	875,089			
Wireless Apparatus, including Valves	1,029,869	1,052,802	1,268,280	74,755	72,363	176,061
Telephone and Telegraph Apparatus	894,390	1,273,799	1,420,250	5,558	6,646	6,732
Electric Lighting Appliances, Accessories, Fittings and Parts:—						
Bulbs and Discharge Lamps	147,204	143,917	117,585	6,880	13,330	17,047
Other Descriptions	402,164	409,535	294,788	9,587	4,640	28,093
Batteries (primary)	67,923	125,221	99,059	—	—	—
Accumulators, Portable	203,551	199,718	192,957	—	—	—
,, Stationary	55,231	39,708	131,634	—	—	—
,, Parts and Accessories	40,604	88,538	59,047	—	—	—
Electric Cooking and Heating Appliances	303,069	287,022	218,535	—	—	—
Ammeters, Voltmeters, etc., and Parts	72,990	94,340	88,043			
House Service Meters	181,960	156,451	109,897	14,122	30,277	35,292
All Other Instruments	71,424	115,264	132,498			
Electro-Medical Apparatus	27,110	33,268	39,895	—	—	—
X-Ray Apparatus, etc.	108,329	59,749	40,610	20,575	39,363	14,658
Insulating Materials	145,158	147,439	172,839	—	—	—
All Other Articles	340,570	489,289	448,789	76,406	124,749	120,492
Total of Group	5,853,189	7,005,037	6,706,386	214,208	294,725	403,656
Electrical Machinery:—						
Generators (not exceeding 200 kW)	236,507	541,479	945,962			
,, (exceeding 200 kW)	395,059	147,224	238,045	105,532	28,543	42,099
Parts	125,534	73,702	202,143			
Motors	584,164	807,195	712,182	43,927	29,065	34,044
Convertors, Transformers, Rectifiers, Motor Control Gear, Switchgear, other machinery	1,077,817	1,437,926	1,840,063	8,061	8,338	13,845
Fans, Electrically and Power Driven	131,748	100,074	117,501	—	—	—
Vacuum Cleaners or Electrically Operated Appliances	260,385	268,792	298,656	2,873	7,567	11,618
Total Appliances and Machinery	8,664,403	10,381,429	11,060,938	374,601	368,238	505,262

The BUYER'S *Column*

Smaller Cooker Switches

A NEW reduced size cooker switch recently marketed by TURNRIGHT CONTROLS, LTD. of West Hill, Hoddesdon, Hertfordshire, has several interesting features of design. Rated at 15 amp 250 V (a.c. only), the switch has slow make and slow break and has a height and width of only $1\frac{7}{8}$ in. although the dimensions to the ends of the terminals remain the same as in the q.m.b. switches in general use, thus eliminating the necessity for change in cooker wiring and the possibility of reduced clearances to the front panel. For similar reasons, the sizes of shunts, clamps and binding screws remain unchanged.



The Turnright slow make-and-break cooker switch

It is claimed that this switch is the first reduced-size switch to be available with a porcelain body. In addition, a new type of push-on handle is available which cannot be removed unless the grub screw is completely unscrewed. The price is approximately 20% less than the standard q.m.b. switch, we understand.

Glass Electrodes for Alkaline Solutions

MEASUREMENT of pH of highly alkaline solutions presents difficulty when ordinary soda glass electrodes are used, since sodium ions in the solution tend to contaminate the electrode, causing a semi-permanent reduction in sensitivity. MUIRHEAD AND CO., LTD. of Beckenham, Kent, now announce a new lithium glass electrode suitable for use up to 13·5 pH in the alkaline range. Price is £2 7s. 6d.

Two New Profile Projectors

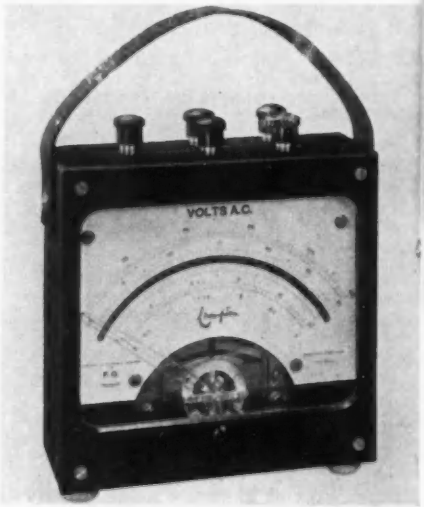
TWO new profile projectors, for the optical inspection and gauging of machined components, have been marketed by NEWTON AND CO., LTD. of 72 Wigmore Street, W.1., for magnifications of 10 and 25 diameters respectively. The larger unit gives a screen picture of 15-in. dia., with an error not exceeding 0·001 in. with a 78-in. throw, the smaller instrument having a throw of 33 in., the focal length of the lens being 3 in. in either case. Jigs and fixtures for the mounting of components can be supplied to order. A 96-W 12-V lamp is used, with a transformer having tappings to adjust for variations in supply voltage. Other attachments for crack detection, etc., are available.

"Teddington" Pressure Controls

A NEW pressure control, the "Teddington" type Q.Y., has been placed on the market by THE BRITISH THERMOSTAT CO., LTD., of Windmill Road, Sunbury - on - Thames, Middlesex. Developed for commercial and industrial applications, including refrigeration, the unit is of compact dimensions (approximately $5\frac{3}{4}$ in. high by 3 in. wide by $2\frac{1}{4}$ in. deep) and is supplied with three standard ranges for low, medium and high-pressure duty between the limits of 28 in. Hg vacuum and 250 lb/sq in. The switch is a snap-action s.p.d.t. so that it can be used for making or breaking circuits. Weight is approximately $1\frac{1}{4}$ lb. and the list price £2 10s.

No Weakness on this Pointer

TO obviate the weakness inherent in long knife-edged pointers operating over two or more scales on one instrument, CROMPTON PARKINSON, LTD. of Crompton House, Aldwych, W.C.2, have developed a "bowstring" type of pointer, consisting of a fine wire strung across a hairpin bow of



The Crompton Parkinson "bowstring" pointer

light aluminium alloy, the metals used ensuring that with wide variations in temperature, there is no slackening of the string wire or distortion of the bow. This type of pointer is particularly suitable where two pointers cross and the point of intersection has to be read quickly, over non-radial lines where an anti-parallax mirror cannot be used.

Testmeter Range Extended to 10KV

FROM TAYLOR ELECTRICAL INSTRUMENTS, LTD., 419/24 Montrose Ave., Slough, comes an announcement regarding a high-voltage adaptor for their model 170A electronic testmeter, which extends the range of d.c. measurements up to 10 kV, thus filling the demand for reliable measurements for television service work. Deliveries will commence at the end of June and the price is 37s. 6d. net.

Taylor h.v. adaptor for the 170A testmeter

TRADE PUBLICATIONS

MOTORS AND PLANT. Reliance Wholesale Ltd., 92/3 Great Russell Street, London, W.C.1, send us their latest catalogue No. 494. It is a really comprehensive issue covering in detail motors, instruments, control gear, and all associated equipment.

CONSTRUCTIONAL UNIT. "Dexion News" is the title of a periodical booklet issued by Dexion Ltd., 189 Regent Street, London, W.1, which surveys the latest applications of Dexion Angle.

ALUMINIUM ALLOYS. A survey of the works processes and illustrated examples of the range of products are contained in the brochure issued by High Duty Alloys, Ltd., of Redditch, Worcestershire.

BATTERY CHARGING. Catalogue V.1014 issued by the General Electric Co., Ltd., of Magnet House, Kingsway, W.C.2, covers very comprehensively the range of G.E.C. equipment for industrial battery chargers.

DOMESTIC APPLIANCES. A new series of leaflets has now been produced illustrating the range of appliances and heaters available from L. G. Hawkins and Co., Ltd., 30 Drury Lane, W.C.2.

ELECTRODE WATER BOILERS. From G. W. B. Electric Furnaces, Ltd., Dibdale Works, Dudley, Worcester, comes a pamphlet describing a new product of the company, "Autolec" Electrode Water Boilers.

RESISTANCE WIRES AND TAPES. These are the subject of the latest booklet issued by Vactite Wire Company, Ltd., 24 Queen Anne's Gate, London, S.W.1.

PHOTO-ELECTRIC EQUIPMENT. A useful range of this equipment is described in a new series of leaflets received from Radiovisor Parent Ltd., 1 Stanhope Street, London, N.W.1.

LABORATORY EQUIPMENT. Many electrical appliances are amongst new laboratory equipment which forms the subject of new leaflets issued by Griffin and Tatlock, Ltd.

ELECTRIC MOTORS. "Lancashire-Crypto in Industry" is the name of brochure ML66 issued, as may be expected, by Lancashire Dynamo and Crypto Ltd., Trafford Park, Manchester 17.

LIGHTING FITTINGS. Issued in loose leaf form "in view of the constant development of fluorescent tubular lighting," the catalogue of lighting equipment issued by Benjamin Electric Ltd., Brantwood Works, Tottenham, London, N.17, should be on every lighting engineer's bookshelf.

IRON CASTINGS. Meehanite metal and its applications are surveyed in a new brochure prepared for the International Meehanite Metal Co., Ltd., 66 Victoria Street, S.W.1.

TESTING INSTRUMENTS. "A comprehensive guide to Avo electrical testing instruments" is the style of a publication now available from The Automatic Coil Winder and Electrical Equipment Co., Ltd., Winder House, Douglas Street, London, S.W.1.

CONDUIT FITTINGS AND WIRING ACCESSORIES. List. No. 04/31 issued by Metway Electrical Industries, Ltd., King Street, Brighton, Sussex, gives details of the current stocks and lines available from this well-known firm.

PLUGS AND SOCKETS. Musings of an engineer at his ease form the substance of the "Wylex Armchair" monthly note from Geo. H. Scholes and Co., Ltd., Wylex Works, Wythenshaw, Manchester. There are also one or two good points concerning "Wylex" accessories.

DUST COLLECTING PLANT. From Prat-Daniel (Stanmore) Ltd., Dalston Gardens, Stanmore, Middlesex, we have received an illustrated folder Cat. P.21, dealing with the P.D. low resistance dust collector which has been designed essentially for use with small boiler plants having steel chimneys to provide an efficient yet cheap grit-arresting plant.

FUEL OIL FILTERS. Diesel generator plant engineers will be interested in the booklet which C.A.V. Ltd., Acton, London, W.3, have published. Its title, "The storage and filtration of Diesel Fuel Oil," explains its contents.

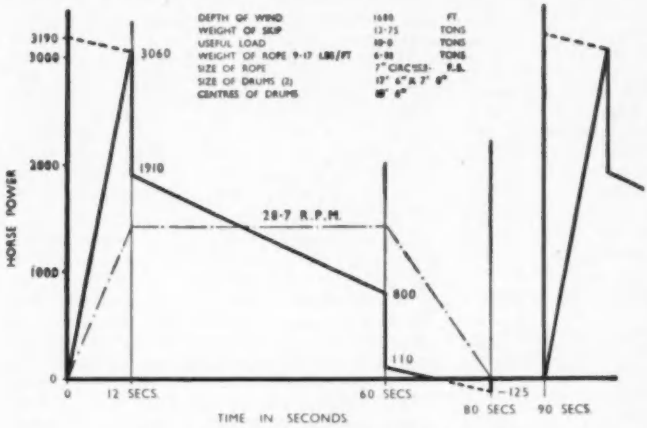
CLOTHES DRYING CABINETS. In preparation for the winter months, dealers should prepare to stock these useful items for the home. Details of the "Victor" electrically heated clothes drier are contained in a leaflet issued by the Victor Mfg. Co. (Greengates) Ltd., New Line Works, Greengates, Bradford.

STEEL CONDUIT. Prices of steel conduit manufactured to B.S.S. 31/1940 are listed in Publication M71/1 issued by Metway Electrical Industries Ltd., King Street, Brighton.

A HIGH-SPEED SKIP WINDER

New Installation at Calverton Colliery

CALVERTON COLLIERY, situated in the Nottingham coalfields, is designed to produce one million tons of coal per annum, using two-shift working. In order to raise this quantity of coal to the surface a skip winder, made by G.E.C., has been installed at No. 2 shaft. Each skip will hold 10½ tons, and the rate of coal raising will be 400 tons per hour. At the moment the equipment is being used for shaft sinking, but it will ultimately operate at a rope speed of 1,580 ft/min, with a winding time of 80 sec, an additional 10 sec being allowed for loading and emptying the skips. The winder drums are 17 ft 6 in. dia and 7 ft wide and rotate at a speed of 28·7 r.p.m.



Power-Time graph over typical winding cycle

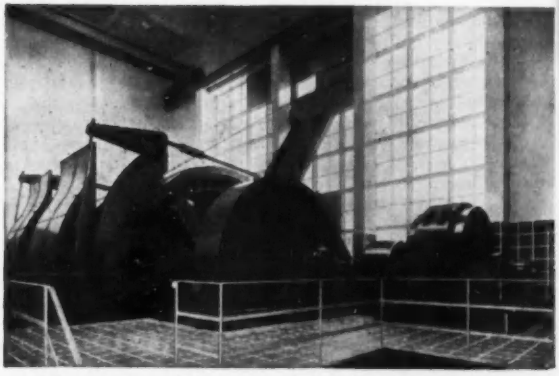
Electrical Equipment

The incoming 3·3 kV, 3-phase supply to the engine house, terminates at a 3-unit cubicle type switchboard facing the control cabin. From this board the outgoing supplies to the stator of the winder motor and the auxiliary transformer are controlled by means of 400-amp manually-operated circuit breakers rated at 75 MVA breaking capacity. Triple-pole isolators are provided in each circuit.

The main driving motor is of the reversible slip-ring induction type, rated at 1,750 h.p., 240 r.p.m. with a peak h.p. of twice full load. The construction follows standard G.E.C. winding practice, the insulation of the rotor being designed to withstand the stresses imposed by reverse current breaking.

In the basement of the engine house, below the winder, is contained the stator reversing contactor and a liquid controller. Up to 150 operations per hour may be carried out by the former, in both forward and reverse directions. It is of the heavy duty air-break type and is fitted with both mechanical and electrical interlocks. The liquid controller is of the electrode weir type in which the moving electrodes act like a weir to retain or release the electrolyte in three insulated chambers. A pump restores the electrolyte from a lower drain compartment into a common header tank which supplies the three chambers.

In view of the weight of the moving parts of the liquid controller a servo unit is employed, both for operating them and also for deter-



General view of the engine winding house showing drums

mining the rate of acceleration of electrode movement and consequently of the winder. This relieves the driver of any responsibility with regard to the acceleration period and all that is necessary is for him to move the control lever to the full-on position and the servo unit then takes care of the rate at which the controller is brought into action. The servo itself utilises pressure oil as a prime mover, and suitable follow-up gears are provided so that at all times the electrode position corresponds with the position of the main control lever, except when the acceleration is taking place.

An auxiliary transformer rated at 20 kVA is used to give a 450 V supply for electrolyte and oil-pump motors, and a bank of metal rectifiers gives a d.c. supply for operation of the coils of the forward and reverse contactors. The transformer itself is connected in delta-star and earth leakage protection.

The master controller is of the drum type and is mechanically interlocked with the winder operating lever. Full protection is provided against overwind, backing-out and oil failure, and emergency tripping is afforded by a solenoid inter-coupled with the brake gear.

NEW LITERATURE

The Electrical Equipment of Automobiles

by S. Parker Smith, C.B.E., D.Sc., M.I.E.E.

IT is a far cry from the trembler-coil and acetylene lamps of the old motor car of the nineteen-hundreds to the radio-fitted modern vehicle, equipped with self-starter, voltage regulator, coil ignition, electric wiper and all the multifarious gadgets added to the electrical system by the up-to-date manufacturer. As a result the electrical complexity of a present-day car is such that it is in effect a subject complete in itself.

Produced first in 1927, this excellent book gives a complete review of the principles and operation of the electrical equipment installed in motor vehicles on the road today. Care has been taken not to eliminate ruthlessly much of the earlier information, as many elderly vehicles are still to be seen in this country.

Although primarily produced for educational purposes, the volume is of great use in the practical diagnosis and elimination of faults, as many typical curves are available which are not given in manufacturers' handbooks as supplied with new cars. Published by Chapman and Hall Ltd., 331 pages, 7½ in. by 5 in., 5th edition. Price 12s. 6d.

The Mathematics of Circuit Analysis

by E. A. Guillemin

THE difficulties of making a rigid analysis of complex circuits are such that a considerable knowledge of advanced mathematical analytical techniques is required on the part of the electrical engineer concerned. It is the primary object of this book to provide the mathematical tools necessary for this work. The mathematics given are those required in the analysis and synthesis of networks, and for the attack on field problems related to transmission lines, waveguides and aerials.

For the solution of networks the use of determinants and matrices is most convenient, and these subjects, together with the geometrical interpretations provided by linear co-ordinate transformations and the closely related discussion of quadratic forms, are contained within the first four chapters. Vector analysis and complex function theory are dealt with in considerable detail so as to cater for the most diverse needs in the network synthesis field. Attention is specifically directed to a detailed discussion of factors relevant to stability considerations and the properties of physical impedance functions.

The book concludes with a chapter on Fourier series and integrals, and covers approximation properties of partial sums of convergence of the series, singularity functions and their properties, elementary transform properties, evaluation of inverse transforms through complex integration and their approximate evaluation by the saddle-point method.

The standard of mathematics is such as to be somewhat beyond that taught conventionally in electrical engineering degree courses, although the book could be used as a text-book for an advanced course in electrical engineering mathematics. Published by Chapman and Hall Ltd., 590 pages, 9 in. by 6 in. Price 60s.

Cold Cathode Fluorescent Lighting

by H. A. Miller, A.M.I.E.E.

BELIEVING in a rich future for cold cathode fluorescent lighting, Mr. Miller has produced this volume for a wide range of readers—in his preface he instances "the student, the electrical engineer, the practical architect, and all distributors, users and potential users of fluorescent lighting." With such a wide range of interests to meet, it is natural that the book should seem somewhat scrappy to the engineer, especially in the chapters attempting to explain the nature of light and vision and discharge phenomena. Manufacture and operation are the next subjects discussed, and then the author proceeds to auxiliary equipment, practical cold cathode lamps, lighting installations and sign and display lighting. In dealing with these practical subjects he is more attractive, and he usefully rounds off the book with some helpful appendices, containing data and a bibliography. Published by the Technical Press Ltd., Gloucester Road, Kingston Hill, Surrey; 130 pages, 8½ by 5½ in. Price 10s. 6d.

THE WEEK

INDUSTRY *in news* COMMERCE

Pay Increase in Contracting Industry

EMPLOYEES in the electrical contracting industry are to receive a wage increase as from July 3. Under the agreement between the National Federated Electrical Association and the Electrical Trades Union, journeymen electricians will receive an additional 2d. per hour (making the rate 3s. 4d. per hour) in the London area, and an increase of 1½d. per hour elsewhere, making the rate 3s. per hour, except in the Mersey district, where it becomes 3s. 1d. per hour. The new hourly rates for adult mates are: London area, 2s. 9¾d., Bristol 2s. 6½d., Mersey district 2s. 6d., and all other areas of England, Wales and N. Ireland 2s. 5½d. There is a corresponding increase in the pay of male labour under 21 years of age.

Both parties have agreed that a payment-by-results scheme, as suggested by a National Arbitration Tribunal last October, is impracticable in the industry. Exploration of such a scheme in the industry has gone on by both parties since 1946, it is pointed out. It will be recalled that at the E.T.U. Conference in May last, Mr. W. C. Stevens, general secretary, stated that the Union had earlier approached the N.F.E.A. and the E.C.A. of Scotland, indicating that they were not prepared to discuss the introduction of systems of payment by results unless they were allowed as an organisation to go in and negotiate the actual system at the time the firms made their tenders. To this, the N.F.E.A. and E.C.A. of S. would not agree.

The N.F.E.A. also announce the inauguration of a new interrupted apprenticeship agreement, to provide for apprentices who do not complete their period of training before serving in H.M. Forces, but who have reinstatement rights.

Tensor Club Formed

TO ELECTRICAL engineers the world over, the word *tensor* is associated principally with the name of Gabriel Kron of the General Electric Co., Schenectady, New York, who pioneered the application of tensor analysis to electrical engineering. The work that first attracted attention was *The Application of Tensors to the Analysis of Rotating Electrical Machinery*, published as a serial in the *G.E. Review* from April, 1935, onwards. This was quickly followed by two books: *Tensor Analysis of Networks* and *A Short Course in Tensor Analysis for Electrical Engineers.*

Methods of analysis revealed by these publications aroused world-wide interest which extended also to the allied subjects of dyadics and matrices. They have been taken up and studied by some engineers in Great Britain, but unfortunately each individual has hitherto worked to a large extent independently.

Now, with the intention of putting engineers in touch with one another and to avoid duplication of effort, the Tensor Club of Great Britain has been formed. At the invitation of the organisers, Gabriel Kron has consented to become its patron.

The Club's activities—in the early stages at least—will necessarily be confined to furthering its objects by correspondence. Membership is open to all those who are actively interested in determinants, dyadics, matrices or tensors, and their application to engineering, wherever they may reside. There is no entrance fee: Members pay an annual subscription of one guinea, and associate members half a guinea. The club's organisers are: S. Austen Stigant, 7 Courtlands Avenue, Hayes, Kent, and W. J. Gibbs, 53 Hillmorton Road, Rugby.

Lighting Conference at Bournemouth

JUDGING by the number of delegates already appointed by local authorities in the British Isles a large attendance is anticipated at the annual meeting and conference of the Association of Public Lighting Engineers. This year the conference is to be held at Bournemouth from 18 to 22 September.

Visitors will also be coming from overseas, and both gas and electricity supply authorities are appointing representatives.

Some extremely interesting papers are to be read at the Winter Gardens and on Tuesday, J. W. T. Walsh, M.A., D.S., M.I.E.E., of the National Physical Laboratory will address the conference on "The Draft Code of Practice for Street Lighting."

Members and delegates will have an opportunity of inspecting up-to-date street lighting apparatus and equipment in the Town Hall, where an exhibition is being arranged in conjunction with the

The First Half-Century

The Huddersfield meeting of the Municipal Electrical Association is over, and the President and Council are to be congratulated on a very successful gathering. One thing very noticeable about the meeting was the apologetic, almost penitential, attitude of the Municipal element. It was not very conspicuous in the debate, and Municipal trading was scarcely mentioned.—*From our issue of June* 28, 1900.

conference. For the ladies, cookery demonstrations are being arranged at the showrooms of the Southern Electricity and Gas Boards.

Mr. King receives an illuminated certificate from Mrs. Storey

Sixty-six Years with one Firm!

IN ADDITION to monetary awards and presentations, Dewrance and Co. Ltd. recently presented illuminated long-service certificates to both serving and retired employees with more than 25 years service. A hundred and forty-nine serving employees qualified with an average service of 35·4 years, while there were 55 retired recipients with an average service of 43·2 years.

Longest serving works employee—Mr. William English of the fitting and test shop—had 53 years service. Eighty-five-year-old Mr. Tom King with 66 years service, held the record for retired employees. Oldest recipient was Mr. C. J. Croft, who completed 50 years service in 1940, and is now 89 years of age.

H.F. Heating Exhibitions

TO WIDEN industrial manufacturers' knowledge of modern high-frequency heating equipment, the G.E.C. has arranged a series of exhibitions of its new 2 kW generators for induction heating and plastic pre-heating. The exhibitions are being held at some of the company's branches.

The first opened yesterday, for 10 days, at Magnet House, Moor Street, Birmingham. Others will be held at Leicester (West Bridge, July 11-12) and Cardiff (Magnet House, Kingsway, July 19-20). Anyone interested in high-frequency heating will be able, during the hours 10 a.m. to 12 noon and 2 to 4 p.m. on the above dates, to inspect the equipment and to discuss its possible applications.

Industrial Radiology

SUMMER meeting of the industrial radiology group of the Institute of Physics is to be held at the New Horticultural Hall, Victoria, London, from Tuesday, 25 July to Friday, 28 July, 1950. Admission to the lectures and Group Summer Exhibition (and to the Technical Exhibition of the International Congress of Radiology) will be by ticket only, obtainable free from the Institute of Physics, 47 Belgrave Square, London, S.W.1, from where details of the lectures are also obtainable.

S.I.M.A. Exhibition and Symposium

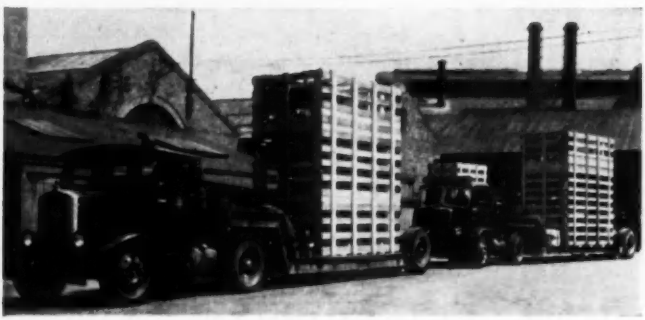
ELECTRONICS section of the Scientific Instrument Manufacturers' Association is holding its annual exhibition and symposium at the Examination Hall, Queen Square, London, W.C.1, from Tuesday, September 5, to Friday, September 8. As in previous years, a series of technical papers will be read by specialist scientists and engineers. There will also be a comprehensive display of the latest types of British scientific and electronic instruments, most of which will be shown in operation during the period of the exhibition.

Technical papers already arranged include "Electronic Optics and the Use of Materials," Professor G. I. Finch; "Recent Improvements in Direct Recording," W. Bamford of Everett, Edgcumbe and Co. Ltd.; "The Vibrating Reed Electrometer and its Application to the Measurement of Small Ionisation Currents," R. Y. Parry and H. W. Finch of E. K. Cole Ltd.; "Recent Improvements in pH Measurement," Electronic Instruments Ltd.; "Industrial Batching and Counting," Cinema-Television Ltd.; "The Measurement of Thickness by Means of Beta Rays," Baldwin Instrument Co. Ltd.; "User Problems in Electronic Instrumentation," Imperial Chemicals Ltd.

Entrance to the symposium will be by ticket (covering also the exhibition), obtainable from the Secretary of the Scientific Instrument Manufacturers' Association, 17 Princes Gate, S.W.7.

Caroline Haslett Trust

APPLICATIONS are now being invited by the Caroline Haslett Trust for the award of a Travelling Exhibition tenable in France for about two months this autumn. Applicants should hold a diploma in electrical housecraft awarded by the E.A.W. and have some knowledge of French. Further details are obtainable from: Caroline Haslett Trust, 35 Grosvenor Place, London, S.W.1.



Two large transformers made by the Electric Construction Co. Ltd. leaving Bushbury engineering works on the first stage of their journey to the port of Durban for Salisbury Municipality. For outdoor service, their capacity is 4,000 kVA stepping up 11 kV/33 kV. Each weighs 17 tons

Members of the Association of Mining, Electrical and Mechanical Engineers who visited the works of Chloride Batteries Ltd. last week showed great interest in these typical mining locos.

Mining Engineers Visit Exide

OVER SEVENTY members of the Association of Mining Electrical and Mechanical Engineers, accompanied by more than fifty ladies spent a day at the Clifton Junction works of Chloride Batteries, Ltd., last week. The delegates, amongst whom were Mr. R. Crawford, president-elect of the Association; Mr. W. T. Barrow, electrical engineer, N. E. Division, N.C.B.; Mr. E. Loynes, chief electrical engineer, N.W. Division, N.C.B.; Mr. R. W. Kirkup, past president, S.E. Yorks branch; Mr. W. D. Morton, Area No. 2 electrical engineer, N.E. Division, and Mr. H. E. Tyson, president of the Colliery Managers' Association, were welcomed on arrival by Mr. E. Powell, Exide sales manager, and Mr. C. Pritchett, commercial manager.

Delegates were taken round the factory and then entertained to lunch. After lunch the visitors were free to inspect a special exhibition of batteries and equipment especially for the mining industry, the outstanding features of which were two battery-powered locomotives, exhibited by Greenwood and Batley and Logan Mining Machinery, Ltd., and running on lengths of specially laid track. Metropolitan-Vickers, Ltd. and the English Electric Co., displayed photographs and artists' impressions of their newly designed battery-powered mining locomotives.

Room with no Echo

THE G.E.C. has built another echo-free room at its Wembley research laboratories to replace the one dismantled in 1939. Designed to give the least possible reflected sound and to eliminate all echos, the primary purpose of a room of this type is to simulate free space conditions indoors for testing various types of equipment.

The walls, floor and ceiling are covered with nearly 3,000 "fibreglass" wedges, each 3 ft long, supported by a welded wire frame. Floor of the room is made of wire mesh, but even this is removed when tests requiring great accuracy are being carried out.

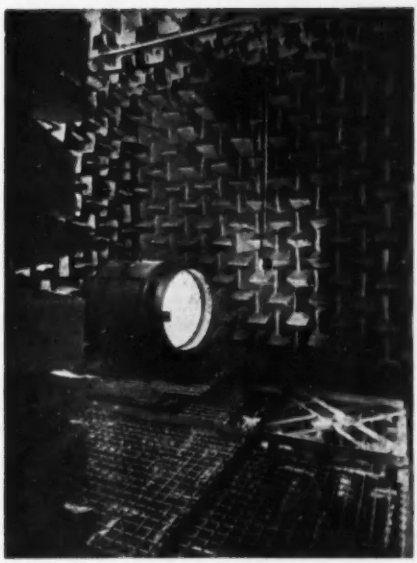
Two overhead tracks at right angles are provided for moving microphone carriages which are automatically locked in position during tests. There is no window but a ventilating duct has been provided and because of the width of the wedges the door hinges had to be specially designed.

Film Boosts Individual Drives

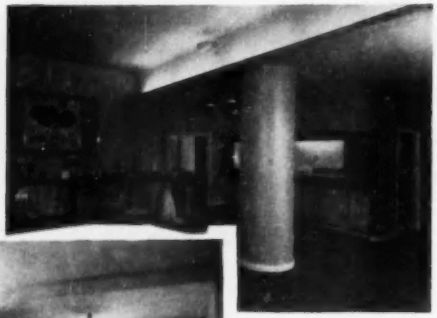
A VALUABLE fillip to industry's present trend towards individual motor driving as opposed to old-fashioned methods of line shaft drive is afforded by a new 20-minute film. *Power without Smoke—Transition in Textiles*, sponsored by Brook Motors Ltd.

Conversion from the old system, has of course, been going on for many years, but the need for exports has resulted in a speeding up of the transfer. The film covers various aspects of wool and worsted cloth manufacture and graphs clarify load characteristics. Emphasis is laid on the savings made by cutting down transmission losses and the elimination of wasteful operation.

Copies of the film in 16 or 35 mm are available on free loan from the publicity department film library, Brook Motors Ltd., Huddersfield.



Measuring arc noise from a G.E.C. 150A double-negative high intensity arc lamp



Two interior views of the new Fibreglass offices in Piccadilly, London

A.S.E.E. at Clarendon Laboratories

ORGANISED by the Central Regional Council of the Association of Supervising Electrical Engineers, a coach trip to Oxford last Saturday was attended by more than a hundred members and their wives.

Following lunch, the party separated, ladies being taken on a conducted tour of the colleges, while members paid a visit to the Clarendon laboratories. Mr. R. A. Parsons, who is engaged in research work at the laboratories, gave a short informal, but exceedingly lucid, lecture on the production of high energy particles, and the respective uses and capabilities of linear accelerators, cyclotrons, synchrotrons, and betatrons. The tour of the laboratories included examination of the large linear accelerator, the betatron and the synchrotron installed, and their auxiliary apparatus, control gear and instrumentation.

Mr. W. F. Parker (vice chairman), in thanking the University authorities, regretted the absence of Mr. C. G. Ramsey (president) who was attending an investiture at Buckingham Palace. Tribute was also paid to the work put in by Mr. W. J. Wheeler (secretary) for his organisation of a very pleasant and instructive day.

New Home for Fibreglass

FIBREGLASS LTD. opened their new West End offices last Thursday with a Press reception. Located at 63/5 Piccadilly, they consist of a central display space, surrounded by individual offices, typists' accommodation and a conference room, and were designed by Mr. T. A. Bird, A.R.I.B.A., the consultant being Mr. E. Maxwell Fry, F.R.I.B.A.

The ceilings of the display space and conference room and the walls of the typists' space have a noise-absorbing covering of resin-bonded fibreglass wool faced with perforated hard board, a small glass panel at one point enabling the construction to be examined. Sectioned models show some of the uses of Fibreglass insulation and there is a display of eighteenth and nineteenth century prints showing the early days of some industries with which Fibreglass is nowadays closely associated.

Jury Urge Action

AT AN inquest at Seaton, Devon, last week, on two yachtsmen who were drowned after the mast of their boat had touched an electric cable spanning the River Axe, the jury's rider urged that immediate action should be taken to safeguard river users.

The two men were sailing a 14-ft dingy up the river when the mast struck an o.h. cable. The shock threw both men into the water.

The inquest was on Frank Ellis, 42, of the Corner House, New Beer-road, Seaton, and Terence Hayes Mallet, 20, of Croyston Holme, Chalmers-road, Axminster. A verdict of "accidental drowning after being rendered unconscious by an electric shock," was returned.

NEWS IN BRIEF

Pirelli-General Cable Works Ltd., have manufactured and installed 10,000 yd of 132 kV single-core oil-filled cable and 1,500 yd of 33 kV single-core solid type cable for Cliff Quay generating station.

In our review of the Mechanical Handling exhibition (June 8 issue) we said that a 20 EH/9 "Stacatruc" model was fitted with a B.T.H. motor. This is not so. "Stacatruc" electric motors are made by an associated company, Crompton Parkinson Ltd.

National Coal Board's production dept. have just published a report, *Pithead Power Plant in Germany and Holland.*

Annual general meeting of East London branch of the Purchasing Officers' Association was held at the Valentine Hotel, Ilford, recently. The meeting was followed by a social.

E.I.B.A. funds are to benefit by £16 raised at a whist drive organised by Tunbridge Wells branch of the E.A.W. Lady Simpson, E.A.W. president, presented the prizes.

Extra high voltage phenomena were demonstrated to members of the Institution of Mechanical Engineers and their ladies when, on the opening day of their Birmingham summer meeting, they were the guests of G.E.C. After lunch at the Midland Hotel, the visitors were shown round the company's high power testing station and 2½-million volt laboratory.

Questions in Parliament

Electric Vehicles and P.T.

During the further consideration in committee of the Finance Bill last week, Sir W. Wakefield made another effort to get electric vehicles excluded from the proposed 33⅓% purchase tax on the chassis value. He stressed that the argument for diverting the carriage of goods from the roads to the rail by limiting commercial vehicles and putting purchase tax on them, did not apply with electric vehicles, whose radius of operation was limited. There was a positive advantage in encouraging the production and operation of battery electric vehicles, because these were charged at night-time, thus helping to level out the B.E.A.'s load. In reply, Mr. Jay said consultation had already taken place in regard to these vehicles, but they did not consider that a case had been made out for exempting them from the tax. These vehicles were in competition with ordinary petrol goods vehicles and it would not be practicable to exempt one class. Regarding exports, from enquiries made it seemed that there were small exports of electric vehicles, and it may be that with sufficient effort these could be increased.

Nationalised Industries (Compensation)

Lt.-Col. Lipton asked whether arrangements would be made to publish the amounts paid and the names of those to whom payment was made by nationalised industries for loss of office and emoluments. Mr. H. Morrison explained that the settlement of individual cases of compensation was a matter of day-to-day administration of the boards, and he could not arrange for publication of the details.

Copper (Bulk Purchase)

Raising the question of the purchase of copper, Mr. J. Grimston suggested that the objections which formerly prevented the re-opening of the London Metal Exchange no longer operated. Replying, Mr. J. Freeman, parliamentary secretary to the Ministry of Supply, explained that the Government had inherited the system of bulk-purchase at the end of the war and had continued it, except in the case of tin, because it was considered on balance to be substantially advantageous. The present situation was that as copper production increased, the advantages of Government buying became less and the disadvantages became greater. But copper was not yet plentiful, the price remained high, and the salient advantage was dollar saving. At present we took practically the whole of the output of Northern Rhodesia (about 200,000 tons a year), 60,000 tons of special shapes and sizes from Canada and U.S.A., some 7,000 tons from miscellaneous sources, and about 20,000 tons from unuseable scrap. The success of the plan hinged on taking the whole output of Northern Rhodesia. Referring to the possibility of the reimposition of the U.S. import duty of 2c. per lb. on copper, he said that unless an Act was passed through Congress not later than June 30, waiving the duty for a further year, it would be automatically reimposed on July 1. In that event it was uncertain whether the United States export price would in the end reflect the full rise of 2c. or something less. But it was most unlikely that the American consumer would be prepared to pay the duty, and it seemed pretty safe to say that the price paid to producers outside the United States would ultimately be the American domestic price, less 2c. The Ministry therefore considered that if the duty were reimposed that it would be quite wrong for the price paid by this country to the Rhodesian producer to include the extra 2c. on account of the element of duty in the United States domestic price. The Rhodesian producers had therefore been invited to agree that a proper interpretation of the Ministry's arrangement with them was that their price to this country should be no more than the United States domestic price, less the import duty if it should be reimposed.

Severance Compensation

Replying to a question by Sir W. Darling, Mr. P. Noel-Baker, Minister of Fuel and Power, said the regulations prescribing the principles on which severance compensation to local authorities in respect of their electricity and gas undertakings was to be distributed, were in the course of preparation and would be published as soon as possible. He understood from the B.E.A. and the Gas Council that compensation would be paid to the authorities shortly after the regulations were made.

North Wales Scheme

When asked by Mr. Marples about the estimated capital cost of the proposed North Wales hydro-electric scheme, Mr. P. Noel-Baker said the B.E.A. expected to complete the surveys of all the schemes involved in about a year's time. It should then be possible to give a useful estimate of the capital expenditure which the schemes, if executed, would require.

Tidal Power Scheme

The Minister of Fuel and Power was asked what proposals he was making to have a tidal power scheme built from which to obtain experience in the working of such projects. He answered that the only scheme of the kind at present envisaged was that based on the Severn Barrage. Even if the necessary preliminary experiments were complete, it would be difficult, in the present circumstances, to give it priority over other more pressing needs. This would not always be true, however, and accordingly arrangements were in hand for the construction of a tidal model of the estuary of the Severn, which was an essential preliminary to the project.

Electric Supply News

Brighton

In March the Corporation approved a proposal put forward by the B.E.A. to supply pulverised fuel ash from the Brighton "A" and "B" generating stations to be dumped on Waterhall Valley for the purpose of levelling the land for future development as playing fields, as reported in our March 2 issue. The Waterworks engineer has now advised the Corporation that the scheme would affect the wholesomeness of the water obtained from the wells, and under the circumstances it has been decided to take no further action with regard to the proposal.

Greenock

Warning to Corporation tenants regarding unauthorised alterations to the original electricity systems in municipal houses has been issued by the Factorage Committee. The committee received a circular from the Department of Health stating that it had come to the notice of the department that tenants of local authority houses frequently altered the original wiring system to fit additional appliances. In many cases the work done does not comply with the regulations and may give rise to fire or serious accident. The circular asked the Corporation to take steps to ensure that tenants do not interfere with these installations.

A clause to this effect is contained in the notice signed by all tenants of Corporation houses, but the Factorage Committee is in addition issuing a warning that tenants altering their electrical installations must first of all notify the Burgh Factor and receive permission.

Isle of Man

Under a Bill just introduced in the Isle of Man legislature, landlords may be compelled to carry out the installation of water and electricity on farms they own, where these services are available. The landlords may obtain financial assistance to do the work.

N. Ireland

When the Erne Drainage and Development Bill passed its remaining stages in the Northern Ireland Senate last week, Mr. Clark, deputy leader of the House, said the Bill was the result of several years of hard and patient work. The agreement was entirely satisfactory, both to the North and the South, and was arrived at in a spirit of co-operation and goodwill on all sides. Those who took part in the negotiations deserved the sincere congratulations of the House.

Newton Abbot

At last week's meeting of the U.D.C. the question of reinstatement of Osborne Park, which has been used as a fuel dump for the power station, was discussed. The B.E.A. had offered to pay for the work to be done. The council resolved that a contract be made for £1,922, plus a contingency item not likely to exceed £50, and that the Ministry of Works be told that on the agreed conditions the council would consent to the immediate derequisitioning of the park and to waive compensation claims.

Whitley Bay

The Urban Council has accepted the terms of the North-Eastern Electricity Board for supplying electricity to housing estates. The terms are that the Council should supply a substation site at 1s. per annum rent; the Council to provide suitable ducts for cables at road crossings for underground cables; the Council to provide suitable access for cables into houses; and the Council to withhold the permanent laying of footpaths until the Board has laid down its network. A number of other North-East local authorities are opposing these terms on the grounds that the amount involved should be borne by the Board as part of its normal expenditure.

LIGHTING SCHEMES

Ellesmere Port.—It having been reported that a special cut-out lantern is not now required, the council is to proceed with its extension of sodium lighting, and has applied for a loan sanction.

Liverpool.—Ald. A. Critchley, chairman of the Corporation Street Lighting Committee, has stated that the financial position was retarding the conversion of certain gas street lighting to electricity. It was planned to make an immediate start on the electrification of side streets which lent themselves to the special type of wall-mounted lanterns. An additional 1,000 columns would be required on new housing estates during the year.

Musselburgh.—Work has commenced on the installation of sodium lighting from the burgh boundary at Magdalene Bridge to Levenhall.

Newbiggin (Northumberland).—The Urban Council is to carry out a £13,780 scheme for converting street lighting from gas to electricity. The scheme provides for 249 lamps. The cost will include £10,540 for lighting main and side streets and £2,860 for lighting the promenade. The scheme is to be submitted for the approval of the Ministry of Transport.

Orpington.—Plans have been drawn up for improved lighting in Court Road, as a continuation of the Sevenoaks Way and Cray Avenue scheme.

Rotherham.—Following an experiment in Corporation Street, it is proposed that mercury vapour street lighting should be installed for the whole of the town centre.

St. Helens.—Sanction has been received to the borrowing of £1,319 for lighting in Greenfield Road and Ramford Road.

Wantage.—The U.D.C. has approved a new street lighting scheme involving the erection of 55 250 W mercury vapour lamps and 192 100 W gas-filled lamps, at a cost of £6,936. Annual cost of the scheme will be £1,330. The Southern Electricity Board is to carry out the work.

Company Activities

Automatic Telephone and Electric Co.

Trading profit for 1949 was £1,184,525 (*£810,585*) after deducting depreciation £107,269 (*£106,244*), directors' fees £3,668 (*£2,141*), audit fee £2,869 (*£2,240*), general contingencies provision £86,770 (*credit £13,619*), scientific research provision nil (*£44,627*) and elimination of profit element in inter-group sales £6,092 (*£17,000*). Add dividends from associated companies £8,374 (*same*). Deduct taxation £651,890 (*£465,428*), leaving net profit £541,009 (*£353,531*) all applicable to holding company. Add taxation provisions no longer required £49,223 (*£2,586*), making £590,232 (*£356,117*). To preliminary expenses written off nil (*£3,095*), capital issue expenses written off £21,453 (*£36,363*), to capital reserves-general nil (*£183*), revenue reserves-general £171,873 (*£153,449*), investments £26,753 (*nil*), stock £175,000 (*nil*), scientific research £47,999 (*nil*), Preference dividends £29,700 (*£24,429*), Ordinary interim 3%, and final 7% plus bonus 2½% on enlarged capital (*all same*) £63,542 (*£47,051*), deferred dividend 10% and bonus 2½% £24,750 (*same*), leaving £312,888 (*£258,153*) carried forward.

British Insulated Callender's Cables

Consolidated trading profit for 1949 was £6,738,264 (*£6,596,476*), plus investment income £102,962 (*£111,475*), profit on realisation of investments nil (*£13,343*) and receipts applicable to earlier years and provisions no longer required £207,030 (*£642,083*), making £7,048,256 (*£7,363,377*). Depreciation absorbs £771,131 (*£745,031*), interest on debentures and loan £85,738 (*£43,125*), underwriting commissions and issue expenses written off £24,000 (*£1,610*), amounts transferred to provisions £135,023 (*£326,350*) and taxation £3,150,567 (*£3,577,527*). Net profit is £2,881,797 (*£2,669,734*), of which £2,628,835 (*£2,337,791*) is applicable to members of B.I.C.C. With £1,480,845 (*£976,377*) brought in there is £4,109,680 (*£3,314,168*) available. To capital reserves £4,630 (*£40,130*), revenue reserves £2,046,466 (*£1,391,954*), dividends paid and proposed by holding company £401,239 (*same*), leaving £1,657,345 carried forward. Trading profit of the parent company was £3,488,289 (*£2,740,187*). Holding company's current assets are listed at £31,540,546 (*£28,266,989*), which included stock and work in progress £14,128,646 (*£14,157,748*) and debtors, bills receivable and loans £14,277,845 (*£13,175,395*). Current liabilities are £14,237,445 (*£12,905,856*). Sir Alexander Roger, chairman, reports that sales in the home market showed a very satisfactory improvement, while the group's contribution to the export drive amounted to £16,500,000 in direct exports alone. Since the company had completed the Liverpool Street/Shenfield electrification contract, traffic had increased 50%, he pointed out.

Broadcast Relay Service

Group trading profit for the year to March 31 last was £1,007,282 (*£865,271*). Depreciation takes £42,394 (*£32,469*), directors' fees £4,636 (*£4,690*), audit fee £4,771 (*£4,127*), bank and debenture interest £26,408 (*£21,984*), general contingencies reserve £250,000 (*£213,000*), U.K. taxation £218,433 (*£250,290*), leaving consolidated net profit £460,640 (*£338,711*). Less share of minority interest £133,052 (*£25,777*), and profit retained by subsidiary companies £191,466 (*£2,270*), leaving profit transferred to Broadcast Relay Service, Ltd., £136,122 (*£310,664*). With £356,700 (*£167,589*) brought in there is £492,822 (*£478,253*) available. To Preference dividends £16,500 (*same*), interim Ordinary 8% and final 5%, both tax free, £105,053 (*same*), leaving £371,269 carried forward.

Brush Electrical Engrg Co.

Application has been made to the C.I.C. for consent to a "rights" issue to stockholders, consisting of 3,200,000 5s. Ordinary shares at par in the proportion of two shares for each £1 of Ordinary stock held on July 4. It is also proposed to create a further 370,000 £1 unclassified shares to round off the total authorised share capital at £4,000,000. Meeting, July 4.

Revo Electric Co., Ltd.

Preliminary details show a profit of £113,719 (*£153,775*), after allowing all charges, including taxation. There is a final dividend of 12½% plus cash bonus 10%, making a total of 27½% (*same*). The profit includes £1,413 over-provision for taxation. The charge for taxation is £122,538 (*£162,790*).

Stream-Line Filters Ltd.

Trading profit for the year to December 31, 1948, was £22,263 (*£24,109*), plus income £2,179 (*£2,464*), making £24,442 (*£26,573*). Depreciation absorbs £8,310 (*£3,006*), audit fee £165 (*same*), directors' emoluments £4,425 (*£4,147*), income tax £5,875 (*£5,550*), profits tax £2,825 (*£3,450*), leaving balance of £2,842. With £21,217 carried forward there is £24,059 (*£28,092*). Interim dividend of 5% takes £2,750, and 7½% dividend £4,125, leaving £17,184 carried forward.

Southern Areas Electric Corporation

Net profit of the parent company for 1949 was £32,585 (*£36,602*) before special taxation credits of £29,247 (*nil*). Dividend 5½% (*same*), and there is £69,567 (*£31,435*) carried forward.

Dividends Declared

British Industrial Plastics. Interim of 8%.

Electric Construction Co. Dividend 12½% (*same*), plus bonus 2½% (*nil*), on increased capital.

Greenwood and Batley. Final Ordinary dividend 10%, making 15% (*same*). Profit, after all charges including tax, £63,962 (*£44,261*).

Richard Thomas and Baldwins. Final dividend of 10%, making 15% (*same*).

Commercial Information

CONTRACTS OPEN

HOME

June 30.—Farnborough U.D.C. Street lighting columns, lanterns, chokes, capacitors, time switches for approx. 130 lamps. D. Stewart Jones, Clerk to the Council, Town Hall, Farnborough. (See our June 22 issue.)

June 30.—Leicestershire C.C. Eight pre-cast concrete lamp standards with lanterns and fittings for installation of a 140-W sodium lighting system at Sawley Cross Roads roundabout on Leicester-Derby road. County Engineer and Surveyor, Greyfriars, Leicester.

June 30.—Maidenhead T.C. Mercury vapour street lighting installation to Group A standard in Bridge Road (A4 trunk road): (*a*) provision and erection of reinforced concrete columns; (*b*) supply and erection of lanterns and fittings, including wiring. Borough Engineer, C. T. Read, 14 Cranford Rise, Maidenhead. Deposit £2.

June 30.—Morpeth T.C. Electrical installation for 57 houses at Spelvit Lane. F. K. Perkins, Borough Surveyor, 36 Bridge St., Morpeth.

June 30.—Penicuik T.C. Electrical work for 32 houses on Eastfield site. Morham and Brotchie, Quantity Surveyors, 29 Hanover St., Edinburgh.

June 30.—N. Scotland H.E. Board. 32 miles of 33 kV and 58 miles of 11 kV single circuit wood pole overhead lines and 77 miles of low voltage lines between Huntly and Ballater in Aberdeen county. Merz and McLellan, 39 Northumberland Street, Edinburgh 3. Deposit £1 1s. (See our May 25 issue.)

July 1.—Grantown-on-Spey T.C. Electrical work for 20 houses. Architect, A. Cattanach, The Laurels, Kingussie. Deposit, £1 1s.

July 1.—Kinlochleven T.C. Electrical work for Tartan Hotel. A. Cattanach, Architect, The Laurels, Kingussie.

July 1.—Rhondda U.D.C. Erection of duplicate set of pumps, electrically driven, with capacity of 21,000 gall per hour against a total head, including friction, of 452 ft. Water Engineer, Water Offices, Pentre, Rhondda. Deposit £1 1s.

July 3.—Barnstaple T.C. Thirty-five electric public lighting columns and lamps for Forches estate. Borough Surveyor, The Castle, Barnstaple.

July 3.—Kirkcaldy T.C. Electrical work for 30 houses at Hendry Rd. and Valley Rd. Burgh Engineer, Osborne House, East Fergus Place, Kirkcaldy.

July 3.—Rochford R.D.C. Installation of electricity at 67 dwellings in Rochford, Great Wakering and Barling Magna. Engineer and Surveyor, Council Offices, Rochford. Deposit £1.

July 3.—N. Scotland H. E. Board. Installation of new equipment and conversion of existing equipment (mainly radio) in consumers' premises affected by change of supply from d.c. to a.c. in Perth city area. Kennedy and Donkin, 244 Bath Street, Glasgow C2.

July 3.—Wokingham R.D.C. Internal wiring for houses Nos. 1-12, Reading Rd., Finchampstead. Housing Manager, Council Offices, Shute End, Wokingham, Berks.

July 5.—Northfleet U.D.C. Installation of an unchokeable 4 in. pump and electric motor at the sewage works. W. G. Futcher, Clerk, Council Offices, Northfleet.

July 5.—Wisbech R.D.C. Wiring of 26 bungalows and 8 houses. Architect, S. G. Bailey, Council Offices, Alexandra Rd., Wisbech.

July 7.—Sheffield T.C. Electrical installations to 198 houses on Parson Cross estate, part 2. Town Clerk, Town Hall, Sheffield1. Deposit £1.

July 8.—Ashton-in-Makerfield U.D.C. Supply of materials for electrical installation in 62 houses on Bryn Station site. Surveyor, Town Hall, Ashton-in-Makerfield.

July 8.—Ennerdale R.D.C. Electric wiring of 310 houses. Engineer's Office, Council Chambers, Cleator, Cumberland.

July 8.—Mallow. Electrification of creamery premises at Mourne Abbey for Mourne Abbey Co-operative Creamery Ltd. Contract includes wiring for light and power and supply of motors and control gear. Creamery Offices, Mourne Abbey, Mallow, Co. Cork.

July 8.—Newburn U.D.C. Electrical installations for 84 houses at Mount Pleasant estate, Throckley. J. A. Weatherley, Surveyor and Architect, Council Offices, Newburn, Northumberland.

July 10.—Frimley and Camberley U.D.C. Supply, erection and putting into service 102 tungsten filament street lamps. Engineer and Surveyor, Municipal Buildings, Camberley. (See our June 15 issue.)

July 17.—Surrey C.C. Erection of 13 pre-cast reinforced concrete columns with 23 ft mounting height; lanterns, 400 W, 4 p.m.v. lamps; and electrical equipment as Class A street lighting for roundabout S.W. of Staines Bridge. Fourteen similar columns for roundabout at Egham (junction of Egham bypass with Glanty-Old Windsor road). County Engineer, Highways and Bridges Dept., County Hall, Kingston-on-Thames, Surrey.

July 17.—Waterford C.C. Electrical services comprising lighting, cooking, laundry, sterilising and associated hospital equipment at Arkdeen Sanatorium. Fourteen major buildings, covering 20 acres. Engineer, N. Matthews, 104 Grafton St., Dublin. Deposit £15 15s.

July 21.—Hawick T.C. Electrical installation for 40 houses on Burnfoot and Burnhead housing scheme. Burgh Surveyor, Municipal Buildings, Hawick.

July 24.—Bootle. Manufacture and erection of pumping plant in Hapsford Road Pumping Station, including two sets of electrically driven unchokeable pumps, each capable of 1,000 gallons per minute, for Rimrose Brook Joint Sewerage Board. Engineer to the Board, G. M. C. Taylor, Artillery House, Artillery Row, Westminster, S.W.1. Deposit £5.

July 31.—Thame U.D.C. Two electrically driven vertical

spindle borehole type pumps, with ancillary equipment. Engineers: John Taylor and Sons, Artillery House, Artillery Row, Westminster, S.W.1.

Aug. 12. — Southport T.C. Supply and erection of five sets of electrically driven (automatically operated) axial flow pumps of a total capacity of 31,250 gallons per minute. Borough Engineer, Town Hall, Southport. Deposit £2 2s.

No date stated.—Cornwall C.C. Electrical services and heating services for new infants schools (160 pupils each) at Newquay and Saltash. S. Gregson, County Architect, County Hall, Truro. Deposit £3 3s. for each school. (Applications by June 30).

OVERSEAS

*Details of items marked * may be obtained on application to Room 1076, Board of Trade, Thames House, North Millbank, S.W.1, quoting reference.*

July 19.—Brisbane. Control equipment for circulating water system, Rockhampton power station. Secretary, State Electricity Commission, Scottish Union House, Eagle St., Brisbane. B.o.T. (Ref. CRE (IB) 56752/50).*

July 28.—Brisbane. Twenty-four 500 kVA, 3-phase outdoor type transformers; eight 1,000 kVA, 3-phase outdoor type transformers. Town Clerk, Brisbane City Council, City Hall, Brisbane. B.o.T. (Ref. CRE (IB) 56751/50).*

July 29.—Karachi. Supply of 23 broad gauge (5 ft 6 in.) main line express and goods diesel electric locomotives for N.W. Railway (Pakistan). Commercial Secretary, High Commissioner for Pakistan. Supply and Stores Dept., 40 Lowndes Square, S.W.1. Reference SS.4190.

Aug. 1.—Karachi. Six 500 kW diesel alternators and two 1,000 kW diesel alternators, together with heat exchangers and spares for power station at Chittagong. Dept. of Supply and Development, Government of Pakistan, Karachi. B.o.T. (Ref. CRE (IB) 56054/50).*

Sept. 3.—Cairo. Supply and erection in the petroleum refinery at Suez of 3 diesel-alternators of 250 kV each with switchboards, exciters, etc. Chief Inspecting Engineer, Egyptian Govt., 41 Tothill St., S.W.1. Payment £3 1s. 6d.

Oct. 3.—Wellington. One 10,000 kVA, 110/11 kV transformer bank and spare unit for Edgecumbe substation. State Hydro-Electric Dept., Wellington, New Zealand.

Oct. 10.—Wellington. Two 50,000 kVA 220/66/11 kV transformer banks and spare units for Islington, Christchurch. State Hydro-Electric Dept., Wellington, New Zealand.

CONTRACTS PLACED

Haltwhistle R.D.C.—Electrical installation in 44 houses on Redburn estate, Douglas Bell

Leeds T.C. Supply of 6 miles of cadmium copper trolley wire. B.I.C.C., £1,801. Supply of switchgear and equipment to replace obsolescent plant in the substation and pumping station at Low Level works, Knostrop. Yorkshire Board. £16,517 (recommended).

Swansea E.C. Electrical installation at new grammar school. Lee Beesley and Co., Ltd., £8,596.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London W.C.2.

Art Electric Ltd., 63a Great Russell St., W.C.1. Manufacturers of and dealers in electric fittings, lamps, etc. Cap.: £100. Subs.: J. D. Finesilver and G. Bernard.

Brown's Refrigeration Ltd., Midland Bank Chambers, Lloyd St., Llandudno. Manufacturers of and dealers in refrigerators and cold storage plant, etc. Cap.: £10,000. Dirs.: A. Brown and Clarice E. Brown.

P. Greenwood Ltd., 42 St. Martin's Lane, W.C.2. To deal with contract for electrical work, to deal with electrical appliances, refrigerators, etc. Cap.: £100. Subs.: P. J. Grazin and Mrs. D. E. Sleigh.

Holly and Co. Ltd., 1 Redland Park, Bristol 6. Manufacturers of and dealers in electrical and mechanical apparatus and accessories, wireless sets, etc. Cap.: £1,000. Dirs.: W. E. Holly, Molly J. James and J. James.

Your Queries — Answered

Single aperture hand driers, makers of? M.A.—Lancashire Dynamo and Crypto Ltd., Acton Lane, N.W.10; Higgs Motors Ltd., Witton, Birmingham; Simplex Electric Co. Ltd., Oldbury, Birmingham; Acru Electric Tool Mfg. Co. Ltd., 123 Hyde Road, Ardwick, Manchester; M. J. Lossos and Co. Ltd., 31 Beethoven Street, W.10; Quiz Electrics Ltd., 160 High Street, Teddington; Bylock Electric Ltd., 109 South Street, Ponders End. (18305)

"Marmet" kettles, makers of? T.D.—Martins Metal Industries Ltd., 121 Kingsway, London, W.C.2. (18309)

"Rock" lamp locks, makers of? T.B.—Checklox, 169 Piccadilly, London W.1. (18326)

"Magic Supercharger" hair drier, makers of? T.E.—Chas. Alexander and Co. Ltd., 74 Portsmouth Road, Surbiton, Surrey. (18317)

Butter churn suitable for fixing in a washing machine, makers of? M.A.—Bulpitt and Sons Ltd., Icknield Street, Birmingham 18. (18322)

"Lyndon" taps and dies, makers of? T.E.—Tom Carrington and Co. Ltd., Stoney Lane, West Bromwich. (18314)

"Ray-o-Therm" health lamps, replacement bulbs, makers of? S.E.—Stanley Cox Ltd., 11 Gerrard Street, London W.1. (18300)

The above are selected from questions we have answered this week. If you have a query, send it to us.

Jackson and Clark (Birmingham) Ltd., 11 Whateley Cres., Castle Bromwich, Warwicks. Electrical, mechanical, heating, lighting, mining, agricultural and refrigeration engineers, etc. Cap.: £1,000. Dirs.: N. G. Jackson and C. R. Clark.

Sait Ltd., 109 Eaton Sq., S.W.1. Dirs. in marine wireless, radar, echo-sounding and direction-finding apparatus, etc. Cap.: £100. Subs.: R. G. Middleton and P. M. Bryce (solrs.), 155 Fenchurch St., E.C.3.

PRICES OF CABLE METALS AND OTHER MATERIALS
(at Tuesday night)

	£ s. d.	New York price
COPPER, electrolytic	186 0 0	£180 0 0
Delivered in 2nd and 3rd month after order	187 10 0	—
Delivered in 4th, 5th and 6th month after order	189 0 0	—
LEAD, good soft pig (foreign)	92 0 0	92 0 0
" " " " "English" quality	93 10 0	—
Delivered in 2nd and 3rd month after order, plus	1 0 0	—
TIN (99-99.75)% (Cash)	600½-601	—
" (3 months)	601-601½	—
ALUMINIUM, commercial purity (del.)	112 0 0	—
ZINC	127 10 0	120 0 0
ARMOURING:		
Galv. Steel Wire (0.104 in.)	43 5 0	—
Mild Steel Tape (0.04 in.)	26 0 0	—

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

R. J. Kemp and Co., Ltd., electrical engineers and public works contractors, 26 Ashby Rd., Coalville. Mr. R. A. Haigh, Court Chambers, Friar Lane, Leicester, appointed liquidator at members' and creditors' meeting on June 14.

Further Meetings

Stamford Electrical Ltd., electrical and mechanical engineers, Park Works, Barnock Rd., Stamford. Further meetings of creditors and contributors tomorrow (Friday) at 2.45 and 3.15 p.m. respectively, at Room 401, 4th Floor, Inveresk House, 346 Strand, W.C.2.

BANKRUPTCY ACTS

First Meetings

Colchester. C. C. Philpott, radio and electrical dealer, 55 High Street, Walton-on-Naze, Essex. Receiving order dated June 16. First meeting on June 30 at 2.30 p.m. at 13a Gt. Colman Street, Ipswich. Public examination on July 20 at 11 a.m. at the Law Courts, Town Hall, Colchester.

Nottingham. R. Phoenix, electrical engineer, described as of 3 Abbotsford Street, Nottingham, but now at 53 Plains Road, Mapperley, lately carrying on business at 1a Abbotsford Street, Nottingham. First meeting on June 30 at 12 noon at Official Receiver's Office, 22 Regent Street, Park Row, Nottingham. Public examination on August 3, at 10 a.m., at the County Court House, St. Peter's Gate, Nottingham.

Intended Dividend

Kidderminster. G. Maddison, electrician, residing at 88 Lea Street, Kidderminster, and carrying on business at Church Street, Kidderminster. Last day for receiving proofs, July 8. Trustee, R. K. Clark, Official Receiver, Somerset House, 37 Temple Street, Birmingham 2.

Voluntary Liquidation

Elmech Ltd., engineers, Altrincham Bridge, Broadheath, Altrincham. A statement of affairs presented at a recent meeting of creditors showed liabilities amounting to £2,742, of which £1,536 was due to trade creditors and £1,205 to loan creditors. Assets were estimated to produce £2,497 and after allowing £111 for preferential claims, there were net assets of £2,386, or a deficiency as regarded creditors of £355. Issued capital of the company amounted to £878 and, so far as the shareholders were concerned, there was a total deficiency of £1,233. It was explained that the company's difficulties arose following a fire which occurred last year when it was found that the assets were under-insured.

A resolution passed confirmed the voluntary liquidation of the company with Mr. A. E. Limehouse, C.A., of Market Place, Rugby, as liquidator, together with a committee of inspection.

Following the statutory meeting it is understood that an offer was made for the whole assets of the company and that this has been provisionally accepted with a view to substantial dividend being payable to the creditors.

TRADE NOTES

Changes of Address.—As from July 1 the sales office of Ardente Acoustic Laboratories Ltd. will be at 309 Oxford Street, W.1 (Tel.: Mayfair 7917), while the new factory address is 62 Horn Lane, Acton, W.3 (Tel.: Acorn 1282). The new address of D.H.S. Electrical Products Ltd. will be 70 Culford Road, Kingsland, N.1 (Tel.: Clissold 0426), as from July 1. Taylor and Parsons Ltd., of Bradford, have transferred their wholesale electrical department to Bond Street, Bradford.

Lead Price.—A reduction of £4 in the price of good soft pig lead is announced by the Ministry of Supply. Thus, from June 24, the price is £92 per ton, delivered.

New Branch. — E. Dawson (Lamp Factors) Ltd. have opened a new depot at 111 The Brook, Chatham, under the charge of Mr. A. R. Yates.

"Toastmatic" toaster. — We learn from Roevac Metal Pressings Ltd., 329 and 366 Stretford Road, Hulme, Manchester, that they have purchased from Keith Electrical Industries Ltd. all rights of manufacture, distribution, etc., of the "Toastmatic" pop-up toaster previously manufactured by them, on which further development work has been carried out. We understand that Keith Electrical Industries Ltd. are continuing with their other lines, at Thorburn Street, Upper Brook Street, Manchester. At the time of the arrangement above noted, Keith were to carry out any repairs that may be required to their own manufacture under their own guarantee. Repairs out of guarantee could be undertaken by Roevac Metal Pressings Ltd.

BUSINESS PROSPECTS

HOME

Beccles T.C. Erection of 18 houses. Housing Surveyor, Town Hall, Beccles.

Bedford T.C. Proposed erection of 48 flats at Harrowden Rd. C. H. Blakeway, Borough Engineer and Surveyor, Newnham House, Home Lane, Bedford.

Birmingham. Regional Hospital Board recommended to approve scheme for the conversion from d.c. to a.c., and renewal of electricity mains at the east block of Selly Oak Hospital. Estimated cost £1,500.

Bootle T.C. Erection of one block of 12 flats on Captain's Lane site, near Ford station. Burgh Surveyor, Town Hall, Bootle.

Bournemouth T.C. M.o.T. has approved trolleybus extension along Castle Lane, between Holdenhurst Rd. and Christchurch Rd. Equipment estimated to cost £6,634.

Crickhowell T.C. Erection of 12 houses at Llanbedr Rd. Architects, J. Merbon Jones and Son, St. Mary's Chambers, Abergavenny.

Crompton U.D.C. Erection of 20 houses on Lower Rushcroft estate. Engineer and Surveyor, Town Hall, Shaw, near Oldham.

Dartford R.D.C. Erection of 10 houses at Lanes End Darenth. Engineer and Surveyor, Council Offices, West Hill, Dartford.

Dunstable T.C. Erection of 26 houses on Beecroft and Brewers Hill estates. Borough Surveyor, R. R. Hole, Municipal Offices, Dunstable.

East Retford R.D.C. Erection of 24 houses at Sutton. R. L. Gray, Clerk, Council Offices, Amcott House, Grove St., Retford.

Gloucestershire C.C. Erection of new primary school at Lynworth, Cheltenham. County Architect, Shire Hall, Gloucester.

Gosforth U.D.C. Surveyor (C. Wyld) has prepared plans for 82 houses between Church Road and Church Avenue for the U.D.C.

Great Yarmouth E.C. Erection of Beccles Road secondary modern school, to accommodate 420 pupils. F. Jackson, Schools Architect, 15 Regent St., Great Yarmouth.

Gwyrfai R.D.C. Erection of 24 houses at Beddgelert. D. H. Roberts, Architect . Cwellyn, Caernarvon.

Hastings T.C. Recommended to approve installation of electricity at All Saints' junior mixed school.

Hemel Hempstead T.C. Erection of 68 houses on Belswains Farm estate. Borough Engineer, Market Square, Hemel Hempstead.

Houghton-le-Spring. U.D.C. intends installing electricity in old people's houses at Greenwood Avenue, Dairy Lane Cottages, and Jubilee Cottages. No contracts have been let.

Hove T.C. Erection of 6 shops with flats over and 16 garages at Sunninghill estate. T. R. Humble, Borough Surveyor, Town Hall, Hove.

Lincoln T.C. Erection of 11 flats and one maisonette at Boultham Moor North estate. City Architect, Stamp End, Lincoln.

Liverpool T. . Erection of 28 houses at Lyme Grove and 477 dwellings at Speke estate. City Architect and Director of Housing, Blackburn Chambers, Dale Street, Kingsway, Liverpool 2.

Longridge U.D.C. Erection of 12 houses on St. Wilfrid's site. J. M. Wharmby, Clerk of the Council, Council Offices, Longridge.

Newburn-on-Tyne. North-Eastern Trading Estates, Ltd., are to build a factory on Stanners site on behalf of the Lemington Glass Works, Ltd. Architects, S. W. Milburn and Partners, 9 Esplanade, Sunderland.

North Witchford R.D.C. Erection of 16 houses. Architect, R. W. H. Jakens, 4 Elwyn Rd., March.

North Riding C.C. To renew electric installation at police headquarters at Northallerton at a cost of £480.

Pittenweem T.C. All trades work for erection of 12 houses at East Braes. L. A. Rollard, Architect and Surveyor, The Albion House, Shorehead, Leven, Fife.

Rawmarsh U.D.C. Erection of 34 houses on Monkwood estate. A. H. Jackson, Clerk to the Council, Council Offices, Parkgate.

Romford T.C. Erection of 28 flats at Rush Green Rd. J. W. Hammond, Architect and Surveyor, 20 North St., Romford.

Royton U.D.C. Erection of 34 houses on Launderbrook site. L. Cookson, Engineer and Surveyor, Town Hall, Royton.

Rugeley U.D.C. Erection of 26 houses at St. Michael's Church site. Engineer and Surveyor, E. J. James, The Council House, Rugeley.

Salford T.C. Erection of additional classrooms at Tootal Drive primary school. City Engineer's office, Town Hall, Salford 3.

Southam R.D.C. Erection of 34 houses at Stockton. Architects, Quick and Lee, 11 Waterloo Place, Leamington Spa.

Stretford T.C. Erection of 36 flats on Railway Rd. site. A. H. Perry, Borough Surveyor, Town Hall, Stretford.

Tow Law. North-Eastern Housing Association, Metrovick House, Northumberland Rd., Newcastle-on-Tyne, are to build 28 houses at Tow Law.

West Penwith R.D.C. Erection of 10 houses on Hayle High Lanes site. S. Caygill, Clerk, Council Offices, 38 Chapel St., Penzance.

Witham U.D.C. Erection of 16 houses at Spinks Lane. A. E. Wiseman, 10 Duke Street, Chelmsford.

Wokingham R.D.C. Erection of 10 houses at Cricket Hill, Finchampstead, Berks. Council's Architect, E. G. V. Hives, 3 Cork Street, Reading.

OVERSEAS

Belgian Congo.—Someca, Boite Postale 66, Leopoldville, wants purchase quotations for electric motors, 1 to 12 h.p., a.c., 3-phase, 50 c/s, 220/380 or 230/400 V.

Belgium.—S. A. Ateliers de Bouchout and Thirion Reunis, 249-253 Chaussee de Vieurgat, Brussels, seeks purchase quotations and agency for automotive parts and equipment, such as fog lights, inspection lamps, rear lights, defrosters, heaters, radios, cigar lighters, sparking plugs, small power dynamos, high-power dynamos, starters, switches, electric windshield wipers, ignition coils, dynamo regulators and relay switches.

Ecuador. Cooperativa Militar de Consumos Limitada, Guayaquil 1149, esquina Olmedo, Quito (P.O. Box 516), would like to contact U.K. exporters of radio sets and domestic electrical accessories.

Leopoldville.—Societe d'Enterprises Electriques au Congo "Entrelco," B.P.3015, Kalina, Leopoldville, are planning to install industrial equipment in the Congo and are anxious to make contact with British firms who can supply them with the following electrical equipment: electric motors, 380 V, 50 periods; starting apparatus of all kinds for above-mentioned engines; protecting apparatus for above-mentioned engines; electric wires and cables, insulated and not insulated, for high and low tension and accessories; equipment for high tension current carried by standard cables up to 1,000 kVA (sub-transformers, supports, cross-supporting sections, disconnectors in oil of 150 MVA disconnecting power, transformers, poles, etc.); equipment for current carried on outside lines with a high-tension of 6,600 V and low-tension of 380 V; fluorescent or incandescent lighting equipment, etc. Trade literature should be in French if possible.

Pakistan. Brigadier W. F. B. Ashton, O.B.E., M.C., Director of Electrical and Mechanical Engineering, Pakistan Army, Rawalpindi, is in need of some hundreds of light-weight, strong, small, battery-charging sets for use with radio in army vehicles. The sets should generate 1,260 W, 32-V d.c., but there is also some demand for 900-W, 24-V d.c. sets, and 700-W, 18-V d.c. sets. Interested firms should write direct to Brigadier Ashton and send copies of their letters to the Defence Service Stores Department, Office of the High Commissioner for Pakistan, 34 Lowndes Square, London S.W.1.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

Eastman. 681,775. Class 7. Electric cloth cutting machines. The Eastman and Textile Machines Co. Ltd., 15/17 City Road, London, E.C.1.

ER with design. 670,305. Class 9. Electrical resistances, condensers, suppressors, potentiometers and volume controls. Erie Resistor Ltd., 2 Carlisle Road, The Hyde, Hendon, N.W.9.

Eziot. B642,070. Class 11. Electric water heaters, boilers and radiators. W. H. Smith and Co., 2 Mansfield Street, Church Gate, Leicester.

Electro-Funditor. B662,596. Class 11. Electrically operated metal-pot heaters for linotype, intertype and monotype machines. Funditor Ltd., 3 Woodbridge Street, E.C.1.

Hypeak. B685,017/7818S. Class 9. Permanent magnets. Swift Levick and Sons, Ltd., Clarence Steel Works, Leveson Street, Sheffield 4.

Wask. 678,748. Class 9. Electrical apparatus (not including apparatus for electrifying wire fencing, or alarm systems. Walter Slingsby and Co. Ltd., Borough Malleable Ironworks, Woodhouse Road, Keighley.

MEETINGS TO NOTE

THURSDAY, JUNE 29

International High Tension Conference (until July 8)—Fondation Berthelot, 28 bis, Rue St. Dominique, Paris.

TUESDAY, JULY 18

Inst. Electronics (N.W. branch).—Fifth annual electronics exhibition (until July 20). College of Technology, Manchester.

TUESDAY, JULY 25

Inst. Physics (Industrial Radiology group).—Summer meeting (until July 28). New Horticultural Hall, Victoria, S.W.1.

WEDNESDAY, AUGUST 30

BRIT. ASSN.—Annual meeting. Birmingham.

BRITISH INSULATED CALLENDER'S CABLES LTD.

The fifth annual general meeting of British Insulated Callender's Cables Limited will be held on July 13 in London.

The following is an extract from the statement by the Chairman, Sir Alexander Roger, K.C.I.E., circulated with the Report and Accounts:—

"As a result of an expansion in both the volume and value of turnover, and the generally favourable trading conditions experienced during 1949, profit on trading of the parent company, investment income and special receipts at £4,828,954 show an improvement of £283,743.

"As compared with the balance sheet value of some £4,500,000 for land, buildings, plant and other equipment it is estimated the present replacement cost is in the neighbourhood of £15,000,000. The position of the company's investments continues to be satisfactory.

"In the balance sheet, fixed assets, investments and current assets amount to over £42,500,000. The additions made to reserves have further strengthened the overall position, capital and revenue reserves (applicable to B.I.C.C.) now amounting to approximately £10,600,000.

"Turnover for the B.I.C.C. Group showed an increase of over £6,000,000 as compared with 1948. Increased prices of metals account to some extent for the higher value of turnover, but there has also been a real increase in the output volume of some of our main products.

"Turning now to export business, I am sure all stockholders will be pleased to know that the direct exports of the B.I.C.C. Group amounted to some £16,500,000, showing an increase over the substantial figures of the previous year.

"At home, the past year has been notable for the change from the sellers' to the buyers' market, a change which was to some extent accentuated in our industry by the cuts imposed by the Government on the capital expenditure of our principal customer groups, the nationalised industries, following the devaluation of sterling.

"Devaluation itself is no long-term solution without its corollary, namely the breaking open of the system of controls, of prices, of subsidies and oppressive taxation.

"An active home business is to us, as to so many industries, a prerequisite to a strong overseas business, and the two together are vital to prosperity. This was never more important than it is today. Competition in overseas markets is becoming more and more acute and is being experienced from an increasing number of countries. But given a reasonably balanced load factor from the home market we are prepared to meet this competition and to do our best to maintain and indeed improve on our achievements."

STANDARDISATION

for economy and efficiency

By using *standard* contacts you will save time and tooling—both of which cost you money—ensure interchangeability *and* simplify your stock problems.

Apart from this we put a very great deal of research and experience into the design of our standards, and if you will let us know your problem we will advise you on the choice of the *contact for the job*.

Send for a series of Data Sheets giving full particulars of our production of materials, components and assemblies for electrical engineering. Free on request.

Specialised products of

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MALLORY

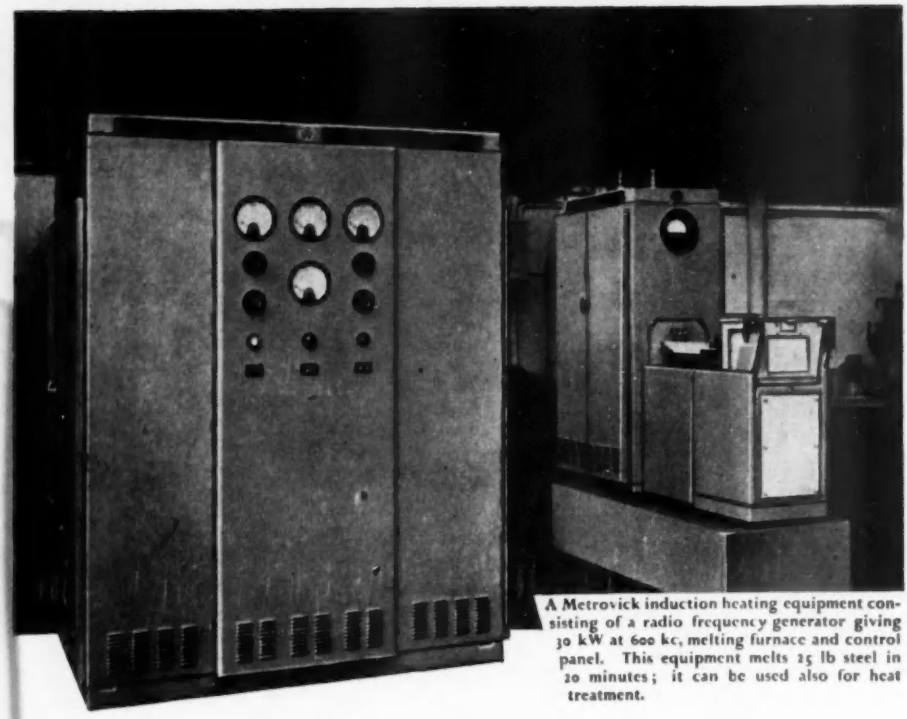
JOHNSON, MATTHEY & CO., LIMITED, HATTON GARDEN, LONDON, E.C.1

Controlling MALLORY METALLURGICAL PRODUCTS LTD.

Telephone: HOLborn 9277. Birmingham: Vittoria Street, Birmingham 1

GD 150

Complete induction heating equipment



A Metrovick induction heating equipment consisting of a radio frequency generator giving 30 kW at 600 kc, melting furnace and control panel. This equipment melts 25 lb steel in 20 minutes; it can be used also for heat treatment.

The Metropolitan-Vickers Electrical Company manufactures complete induction heating equipment of all kinds for use in the laboratory, workshop or foundry for melting or heat treatment of ferrous and non-ferrous metals by means of low, high, and radio frequencies in vacuo, free air or protected atmospheres.

A highly competent technical staff having the advantage of the company's wide experience and unrivalled research facilities, is available for consultation and advice on induction heating problems.

METROPOLITAN-VICKERS ELECTRICAL CO. LTD.

TRAFFORD PARK, MANCHESTER 17

C/L001

CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WANTED · FOR SALE WORK WANTED

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia St., W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 35s. per inch, and all other classified advertisements at 2s. 6d. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

PUBLIC NOTICES

CAROLINE HASLETT TRUST

THE Trust invite applications for the award of a TRAVELLING EXHIBITION tenable in France in the early autumn of 1950.

The award will entitle the holder to study, for a period of two months, some aspect of domestic electrification in that country.

As there are still some restrictions on sterling exports the Exhibition will be limited to cover moderate expenditure on travelling and maintenance.

Applicants must hold the diploma in electrical housecraft awarded by the Electrical Association for Women, and a knowledge of French is very desirable.

Application forms, which must be returned before July 31, 1950, may be obtained from: The Caroline Haslett Trust, 35 Grosvenor Place, London S.W.1. (F 218)

APPOINTMENTS VACANT

LONDON ELECTRICITY BOARD

SUB-AREA COMMERCIAL ASSISTANT

APPLICATIONS are invited for the appointment of a Commercial Assistant on the staff of the Commercial Officer of the North Eastern Sub-Area at 84 Romford Road, Stratford, E.15.

Applicants should be qualified and experienced in:—

(1) The preparation of specifications and estimates for large installations in industrial, commercial and domestic premises.

(2) The organisation, operation and administration of:

(a) Consumers' service sections.

(b) Domestic apparatus maintenance and reconditioning workshops.

(c) Service Centres.

Corporate membership of the I.E.E. or the possession of the Higher National Certificate in electrical engineering or its equivalent would be considered an advantage.

Pending grading of the post under the national agreement of the appropriate negotiating body the provisional salary will be up to £600 per annum, dependent upon qualifications and experience.

Application forms, obtainable from Establishments Officer, 46/47 New Broad Street, E.C.2, on receipt of an addressed foolscap envelope, to be returned by July 14, 1950, quoting reference EST/V/753/T. on envelope and all correspondence. (F 224)

MIDLANDS ELECTRICITY BOARD

Central Gloucestershire Sub-Area

APPOINTMENT OF ASSISTANT DISTRICT ENGINEER

APPLICATIONS are invited for the above position in the Gloucester District of the Central Gloucestershire Sub-Area.

Applicants must have had experience in all branches of distribution work, including operation and maintenance of high- and low-voltage cables, overhead lines, substations, etc. Appropriate technical qualifications will be considered an advantage.

The appointment will be in accordance with N.J.B. conditions and the provisional salary in the range of £459-£475 will be subject to negotiation.

Applications, stating full details of age, qualifications, experience, and present salary, should be forwarded within 14 days to Mr. D. Holt, Manager, Central Gloucestershire Sub-Area, Midlands Electricity Board, 126 London Road, Gloucester.

A. STEPHENS,
Secretary.
(F 254)

BRITISH ELECTRICITY AUTHORITY

South Wales Division

APPLICATIONS are invited for the appointment of SECOND ASSISTANT TECHNICAL ENGINEER (Metering) in the Technical Department of the South Wales Division.

The salary will be in accordance with the National Joint Board Revised Agreement, Class "AX/CX," Grade 2 (£752-£938 per annum).

Applicants should be corporate members of the Institution of Electrical Engineers or possess equivalent qualifications. They should also have had experience in the commissioning, maintenance, and testing of impulse-summation metering equipments as used in generating stations and at major bulk supply points. General experience in a Class A polyphase testing station, including the use of standardising equipment, is desirable.

The appointment is superannuable under the British Electricity Authority and Area Boards' Scheme.

Forms of application may be obtained from the Divisional Secretary at the address below, to whom completed applications should be returned not later than July 10, 1950, in sealed envelope endorsed "Second Assistant (Metering)."

H. V. PUGH,
Divisional Controller.

Cardiff (Pengam Moors) Airport,
Cardiff.
June 22, 1950. (F 238)

BRITISH ELECTRICITY AUTHORITY

Merseyside and North Wales Division

APPLICATIONS are invited for the appointment of BOILERHOUSE SUPERINTENDENT at the Percival Lane Power Station, Runcorn. Salary £707-£737 per annum, being Class "G," Grade 6, of the N.J.B. Schedule.

Applicants must have had sound mechanical training and experience in the efficient operation and maintenance of boilerhouse and auxiliary plant in a power station. Preference will be given to applicants who are associate members of a recognised institution or hold similar qualifications.

The appointment will be superannuable under the British Electricity Authority and Area Boards Superannuation Scheme, and subject to a medical examination.

Forms of application may be obtained from the Divisional Secretary, British Electricity Authority, Merseyside and North Wales Division, Clarke Gardens, Woolton, Liverpool, and should be returned not later than Friday, July 14, 1950.

A. R. COOPER,
Divisional Controller.
(F 242)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

APPLICATIONS are invited for the position of GROUP CANTEEN SUPERVISOR in the East Midlands Division of the British Electricity Authority.

Applicants should have a first-class training in canteen management, covering bulk purchasing of stores, dietetics, hygiene, etc., and should possess City and Guild Certificate No. 150 (Canteen Catering) or equivalent.

The salary for this post will be within Grade 2 (£390-£450 per annum) of the National Joint Council Schedule.

The post will be permanent and the successful applicant will be required to join the Authority's superannuation scheme.

Applications should be made on the appropriate form, which may be obtained from Divisional Establishments Officer, British Electricity House Barker Gate, Nottingham, and should be returned not later than July 11, 1950.

W. S. BURGE,
Divisional Controller.

British Electricity House,
Barker Gate, Nottingham.
16.6.50. (F 185)

SOUTH EASTERN ELECTRICITY BOARD

West Kent District

FIRST ASSISTANT DISTRICT COMMERCIAL ENGINEER

SALARY of £627 per annum, plus London weighting, under the revised N.J.B. Schedule, Class "E," Grade 6. Superannuation will be arranged. Applicants should be corporate members of the I.E.E. or hold equivalent qualifications, and have practical experience in the commercial department of an electricity undertaking. The district is largely residential, with rural and industrial development, and has an installation contracting section and three showrooms. The person appointed will assist the District Commercial Officer in the control and organisation of the department.

Applications, giving two referees, must reach P. S. Watson, Esq., A.M.I.E.E., M.I.I.A., West Kent Manager, South Eastern Electricity Board, 270 High Street, Orpington, Kent, by July 10, 1950.

A. L. BURNELL,
Secretary.

June, 1950. (F 250)

BRITISH ELECTRICITY AUTHORITY

North Western Division

APPLICATIONS are invited for the position of—(a) STATION SHIFT CONTROL ENGINEER at the Greenhill Generating Station, Greenhill, Oldham.

The salary will be in accordance with Class "E," Grade 10 of the revised National Joint Board Schedule, i.e. £488-£562 per annum.

(b) ASSISTANT SHIFT CONTROL ENGINEER at the Agecroft Generating Station, Pendlebury, Salford 6.

The salary will be in accordance with Class "H," Grade 10 (b) of the National Joint Board Schedule, i.e. £330-£342 per annum. This salary is provisional pending negotiation.

Candidates should preferably possess technical qualifications, and experience in a generating station is desirable.

Applications, stating age, present position, and giving full details of qualifications, education and experience, should be received by the Establishment Officer, British Electricity House, Wilmslow Road, East Didsbury, Manchester 20, not later than July 8, 1950. (F 247)

BRITISH ELECTRICITY AUTHORITY

Merseyside and North Wales Division

APPLICATIONS are invited for the appointment of GENERAL ASSISTANT ENGINEER in the Operations Department at Divisional Headquarters, Liverpool. Salary will be within the range £427-£569 per annum, being Class "AX," Grade 8, of the N.J.B. Schedule.

Applicants must have had a good general and technical education and should possess a recognised degree in engineering or equivalent qualifications. A knowledge of draughtsman's duties in connection with power-station work will be an advantage.

The appointment will be superannuable under the British Electricity Authority and Area Boards Superannuation Scheme, and is subject to a medical examination.

Application forms may be obtained from the Divisional Secretary, British Electricity Authority, Merseyside and North Wales Division, British Electricity House, Clarke Gardens, Woolton, Liverpool, and should be returned not later than Friday, July 14, 1950. (F 249)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following appointment :—

BOILER HOUSE SHIFT CHARGE ENGINEER—Brimsdown "B" Generating Station.

Salary in accordance with the revised N.J.B. Schedule, Grade 9, Class "H" (£609-633 per annum, plus 5 per cent. London Weighting).

Applicants should possess a knowledge of the theory of combustion and have had experience in the operation of large boilers working at high steam pressures and fired with chain grate stokers and pulverised fuel. Some electrical knowledge will be an advantage.

The appointment will be superannuable in accordance with the British Electricity Authority and Area Boards Superannuation Scheme.

Applications, stating age, experience and present position, should be sent to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14, to arrive not later than July 14, 1950. Envelopes should be endorsed "Boiler House Shift Charge Engineer, Brimsdown."

W. N. C. CLINCH,
Controller.

Northmet House,
Southgate, N.14. (F 253)

SOUTHERN ELECTRICITY BOARD

No. 3 (Portsmouth) Sub-Area

APPLICATIONS are invited for the position of BRANCH COMMERCIAL SUPERINTENDENT in the Petworth Branch of the Aldershot District of the No. 3 (Portsmouth) Sub-Area.

Applicants should have a sound knowledge of the organisation and operation of the commercial side of the electricity supply industry, particularly in relation to rural development. They must possess a comprehensive knowledge of estimating for all types of wiring installations, together with an intimate knowledge of tariffs, etc. They should also possess a knowledge of staff management and be capable of taking charge of a branch office serving approximately 8,000 consumers.

The commencing salary, which is provisional and subject to adjustment by the appropriate negotiating machinery, will be £510 per annum. The successful applicant will, subject to certain conditions, be required to contribute to the staff superannuation scheme, membership of which is compulsory.

Applications, on forms to be obtained from the Sub-Area Secretary, should be submitted to him at Lower Drayton Lane, Cosham, Portsmouth, in envelopes endorsed "Branch Commercial Superintendent, Petworth," within 14 days of the publication of this advertisement. (F 257)

MIDLANDS ELECTRICITY BOARD

Birmingham and District Sub-Area

APPOINTMENT OF DISTRICT ENGINEER

APPLICATIONS are invited for the position of District Engineer in the Birmingham and District Sub-Area.

Applicants must have had considerable experience in all branches of distribution work including the operation and maintenance of high and low voltage cables, substations, protective gear, etc. Candidates with appropriate technical qualifications will be preferred.

The conditions of service will be in accordance with the National Joint Board Agreement and the provisional salary, subject to negotiation, will be £878 per annum.

Applications, giving full details of experience and qualifications, should be endorsed "District Engineer" and forwarded within fourteen days to : Emil Braathen, Manager, Birmingham and District Sub-Area, 14 Dale End, Birmingham.

A. STEPHENS,
Secretary.
(F 203)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

SHIFT CHARGE ENGINEER, HINCKLEY

APPLICATIONS are invited for the position of Shift Charge Engineer at Hinckley Generating Station.

Applicants should have had sound technical training and practical experience in the operation and control of steam generating plant and switchgear, and preference will be given to candidates who have the Higher National Certificate or its equivalent.

The salary will be in accordance with Class "B," Grade 7 (£492-£518) of the National Joint Board Schedule, and the post will be superannuable under terms and conditions of the British Electricity Authority's Superannuation Scheme.

Applications should be submitted on the official form of application, which may be obtained from the Divisional Establishments Officer at the under-mentioned address and be returned not later than July 10, 1950.

W. S. BURGE,
Divisional Controller.

British Electricity House,
Barker Gate, Nottingham.
June 13, 1950. (F 168)

NORTH WESTERN ELECTRICITY BOARD

No. 1 Sub-Area

APPOINTMENT OF TESTING ASSISTANTS

VACANCIES exist for Testing Assistants at the Polygon Testing Station, Ardwick, Manchester 13, and at the Testing Station, Frederick Road, Salford.

Applicants should have had experience of metering instruments or protective equipment testing, and should be in possession of the Higher National Certificate or equivalent.

Experience in manufacturers' works will be considered as additional recommendation.

The salaries, which are provisional, will be within the ranges :

(a) For Junior Assistants, £280-£400 per annum.

(b) For Senior Assistants, £400-£500 per annum according to age and qualifications.

Applications, stating age, present position and salary, experience and qualifications, should be received by the Sub-Area Secretary, The North Western Electricity Board, Town Hall, Manchester, P.O. Box 493, not later than Saturday, July 8, 1950. (F 225)

SOUTHERN ELECTRICITY BOARD

No. 3 (Portsmouth) Sub-Area

APPLICATIONS are invited for the position of AGRICULTURAL REPRESENTATIVE to cover the Portsmouth and Chichester Districts of the No. 3 (Portsmouth) Sub-Area.

Candidates should have a sound knowledge of the application of electricity in agriculture and horticulture, be capable of preparing estimates for wiring installations and equipment and conducting negotiations. Ability to give advisory lectures to Agricultural organisations will be an advantage.

The salary, which will be provisional, and subject to adjustment by the appropriate negotiating machinery, will commence at £450 per annum. The successful applicant will, subject to certain conditions, be required to contribute to the staff superannuation scheme, membership of which is compulsory.

Applications, on forms to be obtained from the Sub-Area Secretary, should be returned to him in envelopes endorsed "Agricultural Representative," at Lower Drayton Lane, Cosham, Portsmouth, within a fortnight from the date of publication of this advertisement.

20.6.50. (F 226)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

STATION SHIFT CONTROL ENGINEER—DERBY

APPLICATIONS are invited for the position of Station Shift Control Engineer at Derby Generating Station.

Candidates must have had a good general education and technical training, be experienced in the operation and control of all e.h.t. switchgear, and be competent to take charge of the switchboard of a modern generating station. Preference will be given to candidates who hold the higher national certificate in electrical engineering or equivalent qualifications.

The salary will be in accordance with Class "F," Grade 10 of the National Joint Board Schedule, and the appointment will be subject to superannuation under terms and conditions approved by the British Electricity Authority.

Applications should be submitted on the official form of application, which may be obtained from the Divisional Establishments Officer at the under-mentioned address, and be returned not later than July 17, 1950.

W. S. BURGE,
Divisional Controller.

British Electricity House,
Barker Gate, Nottingham.
22.6.50. (F 251)

NORTH WESTERN ELECTRICITY BOARD

APPOINTMENT OF ENGINEERING ASSISTANT

APPLICATIONS are invited for the appointment of Engineering Assistant in the Purchasing Section of the Chief Engineer's Department at Area Board Headquarters, Cheetwood Road, Manchester 8.

Applicants must be corporate members of the Institution of Electrical Engineers, and have had experience with a large firm engaged in the manufacture of plant for the electricity supply industry.

The provisional salary for the post will be within the range £1,100-£1,250 per annum, and will be subject to negotiation with the appropriate body. The post is superannuable.

Applications, stating age, qualifications, experience, present position and salary, should be received by the Establishment Officer, The North Western Electricity Board, Cheetwood Road, Manchester 8, not later than Saturday, July 8, 1950. (F 236)

SOUTHERN ELECTRICITY BOARD

No. 3 (Portsmouth) Sub-Area

APPLICATIONS are invited for the position of BRANCH COMMERCIAL SUPERINTENDENT in the Farnborough Branch of the Aldershot District of the No. 3 (Portsmouth) Sub-Area. The commencing salary, which is provisional and subject to adjustment by the appropriate negotiating machinery, will be £550 per annum.

Candidates should have a sound knowledge of the organisation and operation of the commercial side of the electricity supply industry, particularly in relation to rural development. They must possess a comprehensive knowledge of estimating for all types of wiring installations, together with an intimate knowledge of tariffs, etc. They should also possess a knowledge of staff management and be capable of taking charge of a Branch Office serving approximately 27,000 consumers.

The successful applicant will, subject to certain conditions, be required to contribute to the staff superannuation scheme, membership of which is compulsory.

Applications, on forms to be obtained from the Sub-Area Secretary, should be submitted to him at Lower Drayton Lane, Cosham, Portsmouth, in envelopes endorsed "Branch Commercial Superintendent, Farnborough," within fourteen days of the publication of this advertisement. (F 258)

SOUTH WESTERN ELECTRICITY BOARD

Cornwall Sub-Area

APPOINTMENT OF ADMINISTRATIVE OFFICER

APPLICATIONS are invited for the position of Administrative Officer, Cornwall Sub-Area (Headquarters at Pool, Redruth).

The duties attached to this post include responsibility for implementing establishments and welfare policy; ensuring observance of relevant statutory requirements; investigating accidents and claims; public relations; Trade Union negotiations and staff discipline.

Candidates should have had wide experience in administration and personnel management, preferably in the electricity supply industry; possession of a degree or other appropriate qualification would be an advantage.

The commencing salary, which will be provisional and subject to negotiation, will be within the range £850 to £1,000 per annum.

Applications, giving age and full details of experience, qualifications, present post and salary, to be sent to the Assistant Secretary (Establishments), Electricity House, Colston Avenue, Bristol 1, within ten days from the publication of this advertisement.

Those who responded to an advertisement issued recently in connection with a similar post in the Bristol Sub-Area need not re-apply as their applications will again be taken into account. (F 208)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

No. 4/5 Sub-Area

APPOINTMENT OF ASSISTANT SECTION ENGINEER (ABERYSTWYTH)

APPLICATIONS are invited for the appointment of Assistant Section Engineer (Aberystwyth) at a salary of £430 per annum. This salary is provisional, and subject to such adjustment as may be necessary after negotiation with the appropriate staff organisation.

Applicants should possess the minimum qualification of the Higher National Certificate and have had some experience in the construction, maintenance and operation of high tension and medium voltage overhead and underground mains, with a knowledge of distribution networks.

The successful candidate may be required to satisfy the Board's medical adviser, and if eligible will be required to contribute to a superannuation scheme.

Applications, on forms to be obtained from the Manager, No. 4/5 Sub-Area, Merseyside and North Wales Electricity Board, Electricity House, Rhostyllen, near Wrexham, should be completed and returned to him not later than July 12, 1950.

JAMES RANKIN,
Secretary.
(F 260)

BRITISH ELECTRICITY AUTHORITY

Southern Division

APPLICATIONS are invited for the following vacancies at the new Poole Generating Station, Hamworthy, Dorset.

MECHANICAL MAINTENANCE ENGINEER

Applicants should have a wide experience in the maintenance of generating station power plant and be capable of taking control of a large maintenance staff, machine shop, and supervising turbine and boiler overhauls.

ELECTRICAL MAINTENANCE ENGINEER

Applicants should have had considerable experience on the maintenance of power station electrical equipment and must be capable of controlling a maintenance staff.

All applicants should preferably be corporate members of the Institution of Electrical or Mechanical engineers or have equivalent qualifications.

The conditions of service will be those approved by the National Joint Board and the salaries will be in accordance with Class "H," Grade 7, namely, £692-£722.

The appointments are superannuable and subject to a satisfactory medical examination.

Applications for forms, stating for which post candidates wish to apply, should be addressed to me. Completed forms must be returned by July 14, 1950.

P. D. A. OLIVER,
Divisional Secretary.

British Electricity House,
High Street, Portsmouth. (F 255)

NORTH WESTERN GAS BOARD

MAINTENANCE ELECTRICIAN

THE North Western Gas Board, Liverpool Group, has a vacancy for a Maintenance Electrician at the Southport Undertaking. Industrial experience essential, including maintenance of d.c. motors, generators and switchgear. The successful applicant will be required to pass a medical examination.—Apply by letter, to the Personnel Superintendent, Radiant House, Bold Street, Liverpool 1. (F 252)

EASTERN ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments:

Chilterns Sub-Area

AMENDED ADVERTISEMENT

ASSISTANT COMMERCIAL ENGINEER (Industrial Power)—LUTON DISTRICT

The selected candidate will be required to advise important industrial consumers on matters relating to tariffs, installation of industrial electrical equipment, factory lighting, power factor improvement, etc.

Preference will be given to those having the Higher National Certificate in Electrical Engineering, of good personality and appearance, and having considerable experience of industrial installations, including preparation of estimates for work involved.

The salary offered will be in accordance with the National Joint Board Agreement, Class "F," Grade 9, £536–£560 per annum.

Ability to drive a car is desirable.

Applications should be addressed to The District Manager, Luton District, Chilterns Sub-Area, Eastern Electricity Board, 467 Dunstable Road, Luton, Beds.

Headquarters, Wherstead, Ipswich

ASSISTANT COMMERCIAL ENGINEER—CHIEF COMMERCIAL OFFICERS' DEPT.

The successful applicant will be required to assist a section head—tariffs and economics. Applicants must have had experience of tariff structures generally and especially of supplies to industrial consumers.

Preference will be given to corporate members of the Institution of Electrical Engineers.

The position will be graded in accordance with the National Joint Board Agreement, Class "AX," Grade 2 (Area), £752–£884 per annum. The salary would commence at a step in that grade commensurate with qualifications and experience.

Applications should be addressed to The Chief Commercial Officer, Eastern Electricity Board, Wherstead, near Ipswich.

Suffolk Sub-Area

COMMERCIAL ASSISTANT—STOWMARKET

Candidates should have had a sound engineering training and have obtained the Higher National Certificate in Electrical Engineering or its equivalent, and preferably have had considerable experience of industrial installations, or power tariff negotiations, or works experience covering the utilisation of large power.

The salary for the appointment will be in accordance with Class "G," Grade 10, of the N.J.B. Agreement, viz., £539–£561 per annum.

Applications should be addressed to The Manager, Suffolk Sub-Area, Eastern Electricity Board, Finborough Hall, Stowmarket, Suffolk.

Both salaries and conditions of service will be subject to agreements made from time to time by the appropriate negotiating bodies.

The successful candidates will be required to contribute to a superannuation scheme and may be required to undergo a medical examination.

Applications, stating age, education, experience, and fullest details, including the names of two referees, should reach the officers concerned within 14 days of the appearance of this advertisement. (F 256)

MERSERYSIDE AND NORTH WALES ELECTRICITY BOARD

No. 2 Sub-Area

APPOINTMENT OF JUNIOR COMMERCIAL ASSISTANT (MALE)

APPLICATIONS are invited for the appointment of a Junior Commercial Assistant (Male) in the Board's Service Centre at St. Helens, at a salary of £390 per annum. The salary is provisional, and subject to any adjustment necessary after negotiation with the appropriate staff organisation.

The duties of the post will include assisting with the preparation of tenders for contracting work, the interviewing of consumers and the development of consumers' load.

Applicants should have completed an electrical apprenticeship or a recognised course of study in electrical engineering, and have had some experience in contracting work and the utilisation of supply.

The successful candidate will be required to satisfy the Board's medical adviser, and if eligible to contribute to a superannuation scheme.

Applications, stating qualifications, experience and present appointment, should be submitted to the Manager, No. 2 Sub-Area, Merseyside and North Wales Electricity Board, "Sandiway House," near Northwich, Cheshire, so as to be received not later than July 11, 1950.

JAMES RANKIN,
Secretary.
(F 259)

LONDON COUNTY COUNCIL

Chief Engineer's Department

APPLICATIONS are invited for the position of SUPERINTENDENT of Thames Tunnels on the permanent staff of the Chief Engineer's Department, at a salary of £710 by £30 to £830 a year.

The selected candidate, who should reside within easy reach of Rotherhithe and Greenwich Tunnels, will be responsible for the maintenance and management of Rotherhithe, Blackwall, Greenwich and Woolwich Tunnels including the ventilating and other plant contained therein and of Deptford Creek Bridge. He will be required to supervise running repairs and other works involved in the maintenance of the tunnels, bridge and plant.

Candidates must be suitably qualified mechanical and/or electrical engineers and preferably have served an apprenticeship or have had equivalent training. They must have had experience of the maintenance of large ventilating plant, electric lifts, lighting and power installations, electric pumps and motors, and control of maintenance staff.

Some experience of the maintenance of roads, paving and of general building construction would be considered an advantage.

Application forms obtainable by sending stamped addressed foolscap envelope to the Chief Engineer, County Hall, Westminster Bridge, S.E.1 (quoting Vacancy No. 50/18), returnable not later than fourteen days after the appearance of this advertisement.

Canvassing disqualifies. (857.) (F 227)

EAST MIDLANDS ELECTRICITY BOARD

Burton and District Sub-Area

APPLICATIONS are invited for the position of SENIOR DRAUGHTSMAN to take charge of the Mains Drawing Office dealing with substation construction and Mains Records. Applicants should have had experience in the preparation of substation lay-out drawings and network diagrams and the ability to prepare building specifications will be an additional recommendation.

The commencing salary will be £539 per annum in accordance with Class "G", Grade 10 of the revised National Joint Board Schedule.

Applications, stating age, training, experience, present position and salary, should be forwarded to the Manager, Burton and District Sub-Area, The East Midlands Electricity Board, Horninglow Street, Burton-upon-Trent, within 14 days of the appearance of this advertisement.

P. H. DE KEYSER,
Secretary.
(F 262)

ALUMINIUM WIRE AND CABLE CO. require two fully qualified ELECTRICAL ENGINEERS with a knowledge of overhead transmission lines for developing and extending the use of aluminium conductors.

Applicants must be prepared to travel abroad if required and should preferably be 35-45 years of age. They would work from the Company's London Sales Office.

Write for application forms to Ministry of Labour and National Service, Technical and Scientific Register (K), York House, Kingsway, London, W.C.2, quoting D.181/50-A, which must be returned completed by July 31, 1950. (F 176)

COMPETENT ELECTRICIAN-WIREMAN and Mate for ANDOVER BASINGSTOKE District. Housing situation difficult. Experienced all types installations. Must be able produce proof of ability, good references, character etc. Able to drive van advantage. Good wages and bonus for men willing to work.—Box No. 1451, Electrical Times. (F 217)

CONTROL ENGINEERS

CONTROL ENGINEERS for network operation required by Major Oil Company in Middle East for control centre covering operation of extensive overhead and underground transmission and distribution networks up to 66 kV. Applicants must possess Ordinary or Higher National Certificate in Electrical Engineering, and must be experienced in the operation of indoor and outdoor metal-clad switchgear at all voltages, transformers and associated substation equipment. Age not over 35. Attractive salary, plus generous allowance in local currency, free passages out and home, free medical attention, kit allowance, good leave arrangements, Pension Scheme.—Write, giving personal particulars and details of qualifications and experience, quoting:

DEPARTMENT F.116 TO BOX NO. 2584 AT 191 GRESHAM HOUSE, E.C.2. (E 389p)

CHIEF DRAUGHTSMAN required by well-established switchgear manufacturers transferring their works to South Devon. He would be required to take charge of 4/5 draughtsmen engaged on Medium Voltage Metalclad Switchgear Contracts, and must have a good working knowledge of H.R.C. Fused Switchgear and Oil Circuit Breakers. Required at N.W. London Works for approximately 4 months before transfer. Only first-class men need apply. Good salary and excellent prospects to the right man.
Reply to Box No. 1393, Electrical Times. (F 102p)

APPLICATIONS are invited from ELECTRICAL ENGINEERS with practical experience in electrical installations, for the following positions with a large firm of Electrical Contractors expanding in Scotland:—
ESTIMATING ENGINEERS. Experience in the design, preparation of specifications and estimates, supervision of work undertaken in industrial, commercial and public buildings. Possession of Higher National Certificate an advantage.
STAFF FOREMEN. Experience in planning the layout of contracts, requisitioning of plant and materials and supervision of contracts.
SURVEYORS. After measurement of all types of electrical work, preparation of draft accounts. Knowledge of conditions of Contract and Modes of Measurement essential.
WORKING FOREMEN AND CHARGEHANDS. Experience in the supervision of labour on individual contracts, planning out work and keeping all records.
Applications, giving age, full particulars of training, qualifications and experience, present position and salary, in strictest confidence to Box No. 1457, Electrical Times. (F 239)

DRAUGHTSMAN required, preferably experienced in electrical switch and control gear. Salary commensurate with experience.—Applications in writing, to: Managing Director, Belmos Co. Ltd., Bellshill, Lanarkshire. (F 101)

DRAUGHTSMEN, Senior and Junior, with knowledge of high-voltage transmission systems or design and detailing of small switch and fuse gear. Workshop training desirable. Permanent position, with superannuation scheme. Salary according to age and qualifications.—Apply in writing to the Staff Officer, B.I.C.C., Ltd., Prescot, Lancs. (F 229)

DRAWING-OFFICE PERSONNEL, men and women, are required by the Research Laboratories of The General Electric Co., Ltd., North Wembley, Middx. Vacancies exist both for mechanical and electrical draughtsmen, and some experience on the drawing board, plus workshop training, is essential. Trainees cannot be considered.—Applications should be sent to the Personnel Officer and should contain details of age and record. (F 149)

ELECTRICAL DESIGNER required (S.E. Scotland), thoroughly experienced in design all types of large and small d.c. machines. Applicants should possess university degree in electrical engineering, or equivalent, and have good electrical engineering qualifications, preferably with drawing office and/or test experience.—State age, qualifications, experience and salary required to: Box No. 1441 Electrical Times. (F 212)

ELECTRICAL DRAUGHTSMEN, seniors and juniors, required for long programme of work on oil refineries and chemical plants. Opportunities for good men. Pension scheme. Five-day week, with overtime as required. Salary commensurate with ability.—Write, stating age, qualification, experience, and starting salary to Chief Engineer, E. H. Badger and Sons (G.B.), Ltd., 40 Parkgate Road, Battersea, London S.W.11. (F 58)

ELECTRICAL ENGINEERING DRAUGHTSMAN required, with good practical and technical works' experience including e.h.t. and l.t. distribution, a.c.-d.c. motors and control gear, circuit diagrams and lighting installations. Candidates should be of Higher National Certificate or City and Guild standard and aged under 35. —Write, fully, in confidence, to: E.P. Dept., Michelin Tyre Co. Ltd., Stoke-on-Trent. (F 193)

EXPERIENCED ELECTRICAL LAYOUT DRAUGHTSMEN urgently required. Knowledge of aircraft electrics preferred but not essential.—Apply, stating age and details etc., to Staff and Labour Manager, The Bristol Aeroplane Co., Ltd., Aircraft Division, Filton House, Bristol. (F 96)

Merz and McLellan
Esher, Surrey
have a vacancy for a
MECHANICAL DRAUGHTSMAN.
Applicants should have experience on plant and pipework layout preferably relating to thermal power stations. Salary dependent on qualifications. A.E.S.D. rates minimum. Pension scheme.
Apply, stating age and full details of training and experience to
'Milburn,' Esher, Surrey (F 144p)

The Brush Electrical Engineering Co., Ltd., Loughborough
have vacancies in their Sales Department for ENGINEERS capable of preparing tenders for one or more of the following: Electric motors, Alternators, Switchgear, Transformers.
Minimum qualifications are: Technical education to National Certificate or equivalent standard, good general engineering training and at least two years' experience of tendering one of the above products.
Applications, in writing, to state age, experience and salary, to
Central Labour Department (F 143p)

ELECTRICAL ENGINEERING STORES ASSISTANT required London wholesale depot. Would train suitable applicant.—Box No. 1377, Electrical Times. (F 66)

ELECTRICAL ENGINEERS required for service in Middle East. Applicants should (*a*) possess Ordinary or Higher National Certificate and have had full apprenticeship with heavy electrical equipment manufacturers or with a large colliery or allied fully electrified industry, or (*b*) possess a degree and have had two years' technical apprenticeship with similar firm to above. In each case applicants must have had at least three years subsequent experience on the installation and maintenance of heavy electrical equipment. Maximum age limit 35 years. Attractive salary, plus generous allowance in local currency, free passages out and home, free medical attention, kit allowance, good leave arrangements, pension scheme.—Write, giving personal particulars and details of qualifications and experience, quoting Dept. F.191, to Box No. 2593, at 191 Gresham House, E.C.2. (E 415)

EWBANK & PARTNERS have vacancies for the following:—
DRAUGHTSMAN
(a) MECHANICAL ENGINEERING DRAUGHTSMAN, with experience in power station design and layout.
ENGINEERS
(b) INSTRUMENT ENGINEER, to deal with general instrumentation problems in connection with large power and services problems.
Works experience with a firm of instrument manufacturers is essential, and the duties will involve not only specifying and layout of large instrumentation schemes, but also the commissioning of plant. The duties may involve short visits to home and overseas plants during the commissioning periods.
(c) ENGINEERS FOR INVESTIGATION, TESTING AND COMMISSIONING DEPARTMENT.
Applicants should have a good academic technical qualification and experience in the operation of large power plants. Experience in the development of Heat Balance calculations and diagrams is also required. The duties may involve short visits to home and overseas plants during the plant commissioning period.
(d) ASSISTANT MECHANICAL ENGINEERS, for Contract Department.
Applicants should have had good works experience and technical training up to Higher National Certificate standard. Experience in the design and operation of large power plants an advantage.
(e) JUNIOR TRAINEE ENGINEER for the Investigation, Testing and Commissioning Department.
Applicants should have had a good technical training up to Higher National Certificate Standard and some works experience, preferably in power stations. Duties will involve the keeping of records of the department and calculations dealing with general engineering design.
(f) ELECTRICAL ENGINEER as Assistant to Site Agent on supervision of new construction projects at site.
ENGINEERING CLERK
(g) ENGINEERING CLERK for the Contracts Department.
Previous experience in keeping engineering records essential. Preference given to applicants who have had experience in connection with large power projects involving steam, diesel and hydro plants.
The positions advertised are permanent, offer good prospects and are pensionable.
All applications should be made in writing, addressed to: The Secretary, Ewbank & Partners, 15 Grosvenor Place, S.W.1, and must state position applied for, age and experience of applicant, and salary required. (F 241)

LABORATORY MECHANIC required for electrical laboratory in south-west London for mechanical and electrical work on the construction of experimental equipment; should be able to wire from circuit diagrams. —Box No. 1395, Electrical Times. (F 108)

SALES ENGINEER required to operate in the London area. Must have connections and practical experience in the selling of wiring accessories and installation materials. Age preferably between 30 and 40.—Applications, stating age, experience and salary expected to General Sales Manager, Simplex Electric Co. Ltd., 217/9 Tottenham Court Road, W.1. (F 209p)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

JOHNSON AND PHILLIPS, LTD., have a vacancy in their cable test and research department, for a young ELECTRICAL ENGINEER. Applications are invited from men possessing a degree or equivalent in electrical engineering and only candidates having such qualifications will be considered. Preference will be given to applicants with practical experience of testing methods used for high voltage cables.—Applications, giving full details of age, training, experience, and salary required should be addressed to: Employment and Welfare Manager, Johnson and Phillips, Ltd., Charlton, London S.E.7. (F 220)

JUNIOR DRAUGHTSMAN required. Excellent opportunity for gaining first-class experience in an important branch of the electrical industry. West London area A.E.S.D. London rate.—Write full details of experience to: Box No. 1447, Electrical Times. (F 215)

LARGE manufacturing firm in S.E. Scotland requires TWO ELECTRICAL DESIGNERS, thoroughly experienced all types of induction motors up to 250 e.h.p. Applicants should possess university degree in electrical engineering, or equivalent, and have good practical training, preferably with drawing office and or test experience.—State age, qualifications, experience, and salary required to: Box No. 1443, Electrical Times. (F 213)

LINESMEN-ERECTORS, fully qualified on wood pole and concrete pole construction, wanted for overhead transmission line work in Great Britain and overseas. Standard rates and good prospects of permanent employment. Only fully experienced men need apply.—Write, stating age, experience, etc., to: Box No. 6324, c/o Whites Ltd., 72 Fleet Street, London E.C.4. (F 219)

MAINS AND ASSISTANT MAINS ENGINEERS with experience in h.t. and l.t. overhead and underground distribution required by Scottish firm to design, prepare estimates and supervise construction contracts. State age, qualifications, experience and salary required to Box No. 1459, Electrical Times. (F 240)

PLANNING AND METHODS ENGINEER required. Age 23-25. Preferably with experience of small electro-mechanical parts.—Write, full particulars and salary required to: Box No. 1449, Electrical Times. (F 216)

REPRESENTATIVE required for South West Area, including S. Wales, with good electrical and marine contacts, and carrying one or two non-competitive lines. —Apply, giving experience, etc., to The Secretary, Wm. McGeoch and Co., Ltd., Manufacturing Electrical Engineers and Brassfounders, 46 Coventry Road, Birmingham 10. (F 221)

REPRESENTATIVE required for London and South Coast area with good contacts among electrical factors and engineering establishments to work from our London office. Progressive post available for keen and energetic man, no older than 45; car an advantage. Salary, bonus, and expenses paid.—Apply in writing only, giving full particulars of experience, age, and salary required, to the Secretary, William McGeoch and Co., Ltd., Electrical Engineers and Brassfounders, 46 Coventry Road, Birmingham 10. (F 235)

REPRESENTATIVES with experience required for Temco Wiring Accessories and Synchronous Electric Clocks in those areas covered by Yorkshire, Merseyside and N. Wales, also N. Western Boards. Salary, commission, expenses; car provided.—Replies, stating age, experience and remuneration required, in strict confidence to T. M. C. Harwell (Sales) Ltd., 37 Upper Berkeley St., London W.1. (F 264)

REVO ELECTRIC CO. LTD., require ADDITIONAL SALES REPRESENTATIVES in the London area. Applicants should be 28-35 years of age and must have had actual sales experience and good electrical background. The possession of a car would be an advantage. The position is permanent and offers excellent opportunities for advancement. Apply, in writing giving full details of experience and salary required to Manager, Revo Electric Co. Ltd., 30-31 Great Queen Street, Kingsway, London W.C.2. (F 179)

SALES REPRESENTATIVES required in all areas for marketing an entirely new 5-amp switch of revolutionary design and phenomenal performance. Previous experience and sound established connections essential. Good salary and commission, plus car allowance.—Write, stating age, experience, etc., and area thoroughly covered. Replies treated in strictest confidence.—Managing Director, Box No. 1367, Electrical Times. (F 41)

SANGAMO WESTON, LTD., have a vacancy in their INSTRUMENT SALES CORRESPONDENCE SECTION. Applicants should have a good general technical training, with some specialisation in electrical measuring apparatus. They should be capable of expressing themselves clearly and concisely both in conversation and correspondence.—Applications should be sent in strict confidence to the Employment Manager, Sangamo Weston, Ltd., Cambridge Road, Enfield, Middlesex. (F 200)

SENIOR AND JUNIOR ELECTRICAL DESIGNERS experienced in all classes of a.c. and d.c. dynamo electric machines from 5 to 5,000 h.p./kW, 5-day week. Superannuation scheme in operation.—Applications, stating age, experience and salary expected to Personnel Manager, Lancashire Dynamo and Crypto, Ltd., Trafford Park. (F 151)

SHIFT CHARGE ENGINEERS for electricity supply undertaking in Baghdad. Applications are invited from suitably qualified engineers, preferably between 25 and 35 years of age, who have had experience in the operation of a power station of at least 15,000 kW, with medium-pressure boilers. Salary £1,000 to £1,200 per annum, plus high cost of living allowance. Free house, with heavy furniture, will be supplied, or a monthly house allowance of £12 in lieu.

Three-year contract, renewable, with first-class passage each way, for successful applicant and family (if married). Three months' leave on full pay in U.K. on completion of 24 consecutive months in Iraq, first-class leave passages being paid.—Box No. 1453, Electrical Times. (F 228)

THE GENERAL ELECTRIC COMPANY, LTD., has a vacancy for an INSTALLATION ENGINEER at their branch in Hong Kong. Candidates should be between 25 and 30 years of age, preferably single and have had a number of years' experience in the electrical contracting industry, including estimating. The position is a permanent one, will be well remunerated and is pensionable. —Apply: Staff Manager, The G.E.C., Magnet House, Kingsway, London W.C.2. (F 243)

THE GENERAL ELECTRIC CO., LTD., has a vacancy in the Marine Department at the head office of their sales organisation for an ELECTRICAL ENGINEER, age 25-30, who has served a professional engineering apprenticeship and who has previously had some marine experience. Good starting salary and prospects.—Apply in writing to the Staff Manager, Magnet House, Kingsway, W.C.2. (F 244)

THE GENERAL ELECTRIC CO., LTD., require an INSTALLATION ENGINEER, age 25 to 30, at the Head Office of their sales organisation. Applicant should have served an apprenticeship and subsequently received experience in the contracting industry. A good starting salary will be paid and there are excellent prospects for promotion.—Apply in writing to the Staff Manager, Magnet House, Kingsway, W.C.2. (F 234)

TRANSFORMER INSIDE SALES ENGINEER required thoroughly experienced in estimating and tendering for all types of transformers, large and small, for the home and export markets.—Applications, stating age, practical, technical and commercial experience, and salary required to: Manager, T/M Departments, Bruce Peebles and Co. Ltd., Edinburgh. (F 211)

VITREOUS ENAMELLING SHOP FOREMAN wanted who is fully experienced in processing sheet metal and castings. Knowledge of up-to-date methods, able to control labour and obtain output. Give full details of age, experience and salary required.—Box No. 1445, Electrical Times. (F 214)

WIREMAN ELECTRICIAN wanted to work with owner of small jobbing business near Baker Street Station, who is approaching retiring age; main object view to becoming partner and eventually taking over. Must be prepared for hard work and responsibility. Pay rate, plus bonus of not less than £50 per year to right man.—Write, in first place, to Box No. 1435, Electrical Times, giving full particulars of experience, age, etc., and references. (F 204)

WORKS SUPERINTENDENT required for transformer works manufacturing up to 5,000 kVA capacity units. Rapidly developing organisation offers first class prospects to man having energy and initiative. Good works knowledge necessary, preferably with previous transformer experience.—Box No. 1421, Electrical Times. (F 172)

APPOINTMENTS WANTED

B.E.A. STORES OFFICER (30), experienced storekeeper, stock control, purchasing and selling, seeks position in a private concern. Willing to accept anything with future prospects.—Box No. 1423, Electrical Times. (F 188)

WANTED

WANTED, 20 kVA 230/1/50 METRO-VICK ALTERNATORS. Coventry Climax petrol engines with switchboards. Conversion to 400/3/50 suitable. No deviation from the above specification would be of interest.—Saville-Calvert (Machinery) Ltd. Tel.: Snitterfield 291. (F 223)

A.C./D.C. MOTORS, STARTERS, complete change-over installations.—A.A. Electrical Co., Ltd., 67 Rothschild Road, Chiswick Park, W.4. Phone: Chiswick 5105. (A 20)

WANTED.—D.C. and a.c. ball-bearing MOTORS.—Full details to Britannia Manufacturing Co., Ltd., 22/26 Britannia Walk, London N.1. (A 13)

WANTED, ROTARY CONVERTERS, any size.—Universal, 221 City Road, London E.C.1. (A 16)

WANTED for prompt cash, ferrous and non-ferrous SCRAP; also plant for dismantling. Buyers of second-hand machinery and plant for re-use.—W. and H. Cooper, Ltd., 176 Brady St., Bethnal Green, E.1. (A 1)

WANTED.—Large quantity of 4-in. outside diameter TUBES from the dismantling of old Babcock Water-tube Boilers. Best prices paid. Prepared to purchase Babcock and Wilcox Water-tube Boilers for dismantling. —Apply, giving full details to Midland Iron and Hardware Co., Cradley Heath. (A 5)

WANTED, 3,000 amp. or larger 6 to 10 V PLATING GENERATOR. 40 amp per sq ft of area to be plated.—Box No. 1385, Electrical Times. (F 91)

WORK WANTED

A.C. and d.c. Motor Rewinds and Repairs. Prompt service, fully guaranteed.—Edgware 8631 (4 lines). Service Electric Co., Ltd., Stanmore, Middx. (D 324)

ARMATURE ROTOR AND STATOR WINDING. We specialise in the repair and rewind of all types of electrical machines from fractional h.p. upwards. Special departments for vacuum cleaners, dryers, portable tools, etc. All work fully guaranteed.—Walter Crane, Greencoat Electrical Works, Westgate, Wakefield. Telephone 2172. (A 4)

CASTINGS, Fisher Foundries, Ltd., Greet, Birmingham, have capacity for brass, gun metal and soft grey iron machine moulded repetition castings weighing 1-30 lb. Loose pattern work up to 3 cwt. Delivery by road to all parts. Tel.: B'ham, Victoria 0197. (D 326)

ZEROS REFRIGERATORS.—Complete range of repair and service now available. Equipment reconditioned to conform to pre-war manufacturers' specifications.—Time Engineers, Refrigeration Specialists, 60 Southend Road, Rainham, Essex. Tel.: Rainham 2358; or Southern Area Agency. Tel.: Springpark 4217. Electrical Spares supplied to the trade. (A 639)

BUSINESS OPPORTUNITIES

INTEREST offered in established ELECTRICAL CONTRACTING BUSINESS to person capable of taking charge of business side. Capital required £500/£1,000. Coast town.—Box No. 1437, Electrical Times. (F 205)

LONDON W.—Active interest offered in established RADIO AND ELECTRICAL RETAILERS, doing turnover of £52,000 p.a. Investment £4,000. Six months' trial period on salary.—Apply, Commercial Development Co. (Sevenoaks), Ltd., 199 London Road, Sevenoaks, Kent (Sevenoaks 3054). (F 242)

AGENCIES

TECHNICAL REPRESENTATIVE requires agencies for all types electrical goods including switchgear, accessories, cables, conduits, etc., covering Kent and S.E. Coast. Commission or salary.—Box No. 1433, Electrical Times. (F 199)

FOR SALE

DOMESTIC APPLIANCES

G.B.M. IMMERSION HEATERS, all lengths 12 in. to 42 in., 2 kW and 3 kW, standard voltages. Also 4 kW (non-taxable), all sizes. Satchwell thermostatic control. Guaranteed two years. Immediate delivery. For illustrated brochure and trade terms write direct to manufacturers.—G.B.M. (Electrical) Birmingham Ltd., 439 Moseley Rd., Birmingham 12. Phone: Calthorpe 2854. (F 178)

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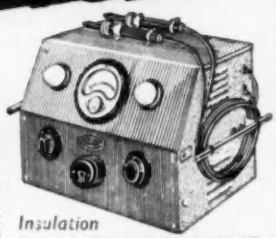

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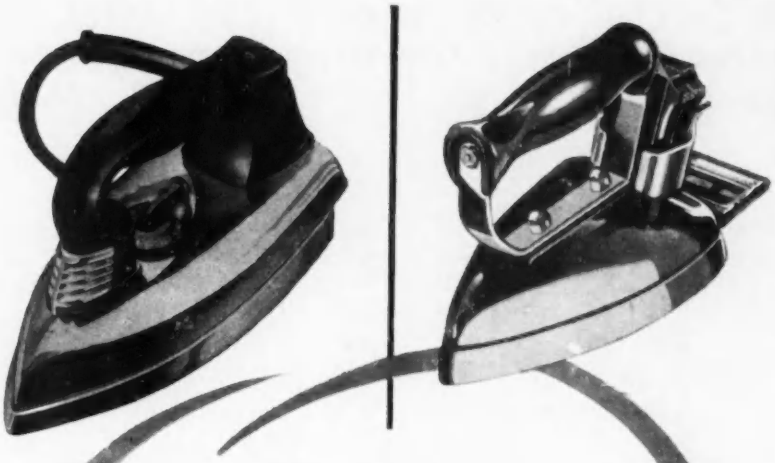

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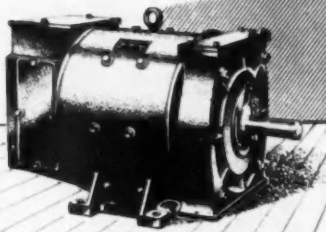

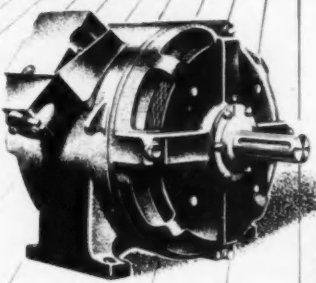

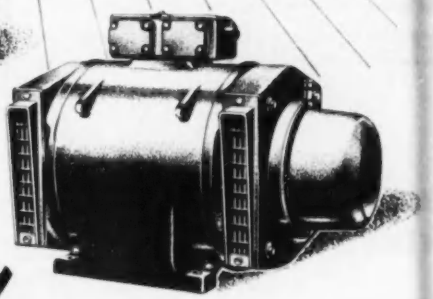

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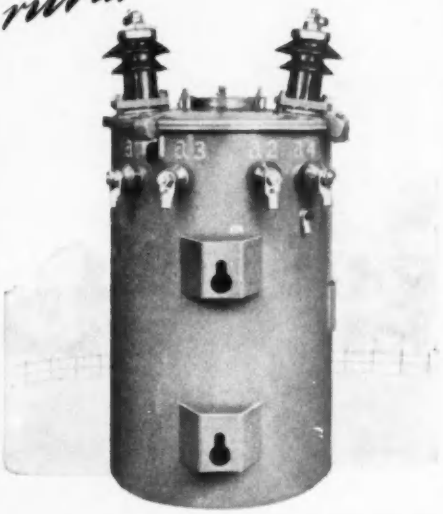

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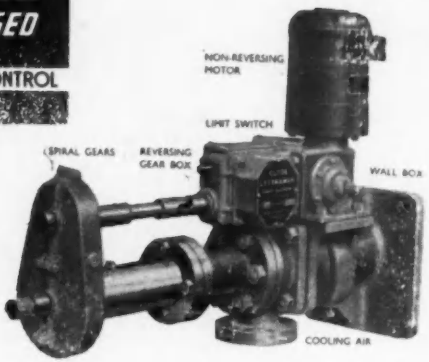

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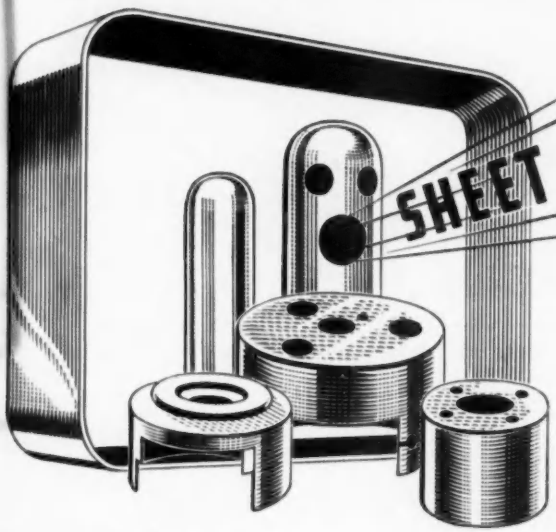

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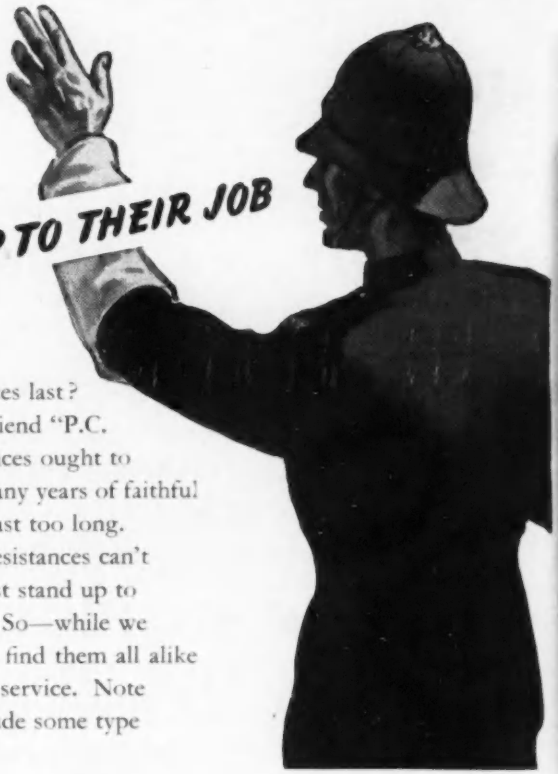

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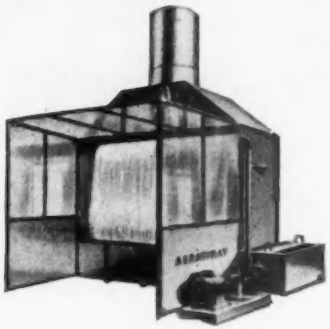

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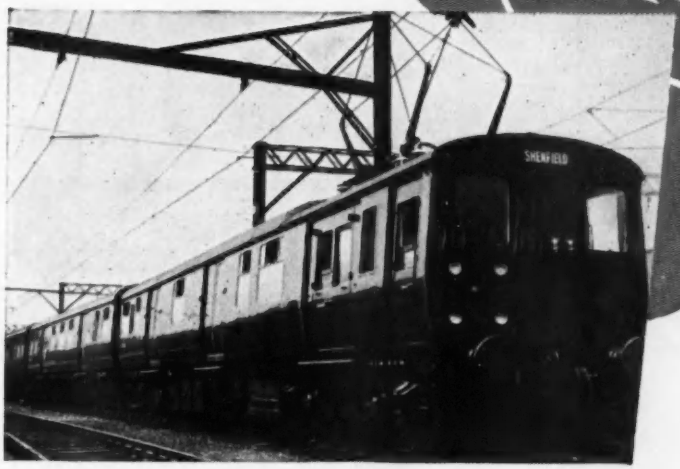

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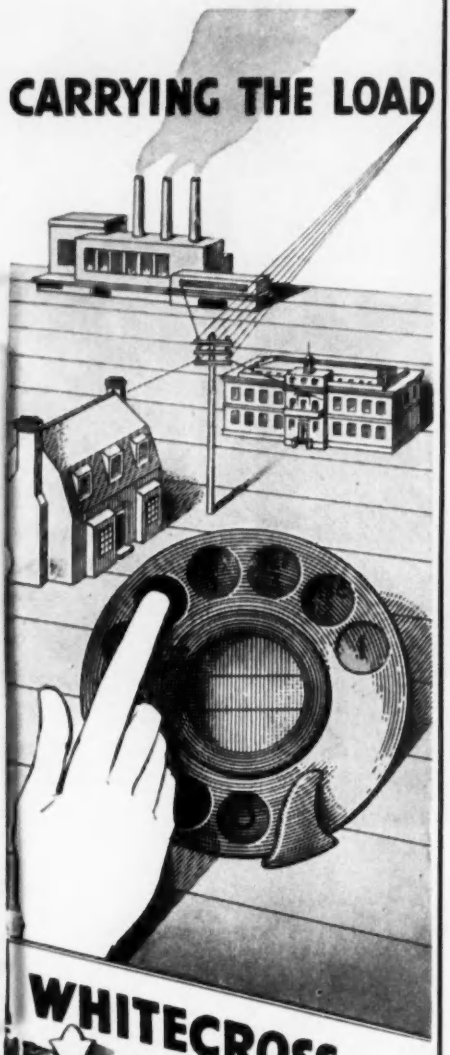

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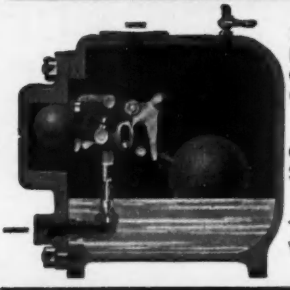

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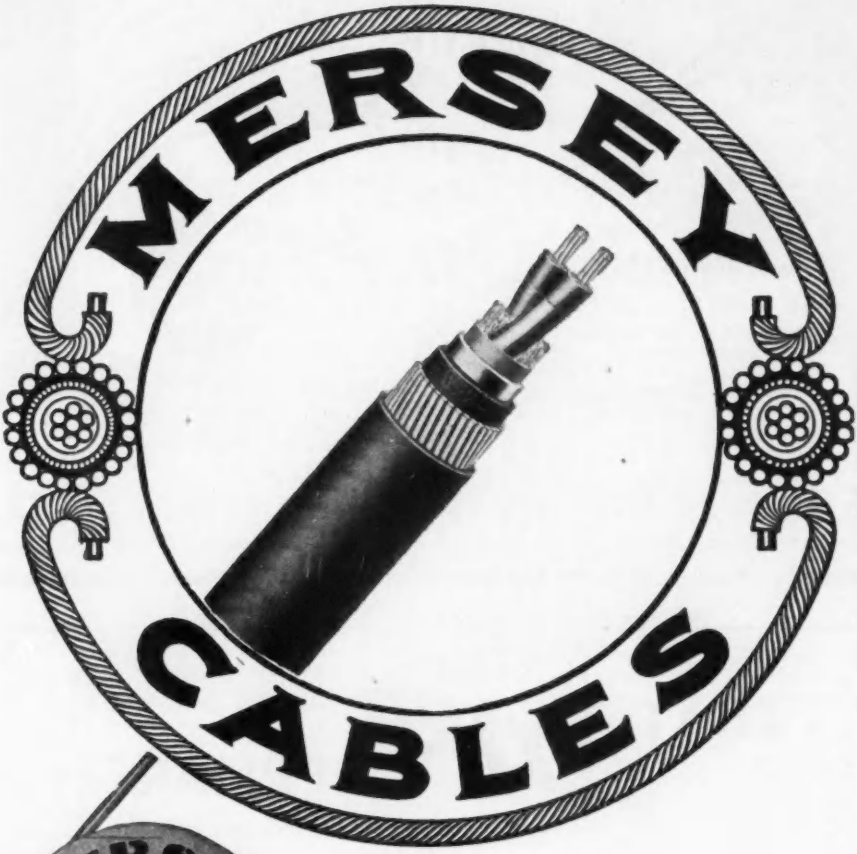

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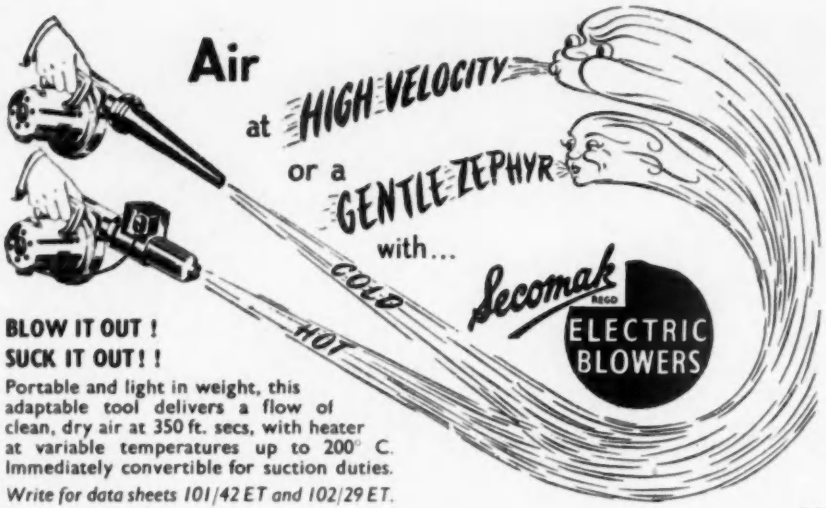

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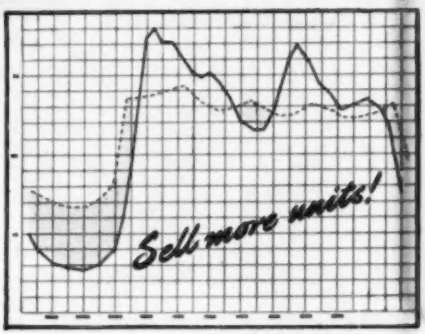

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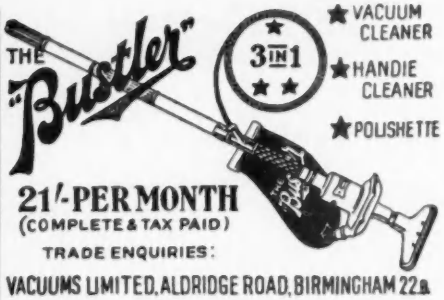

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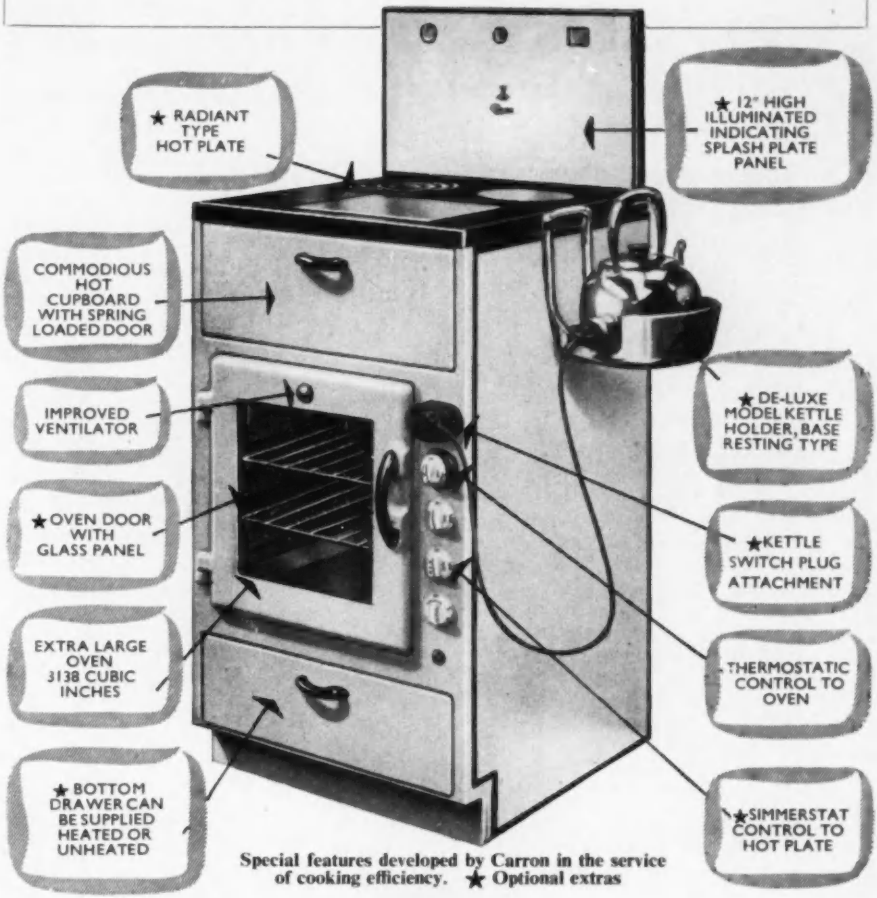
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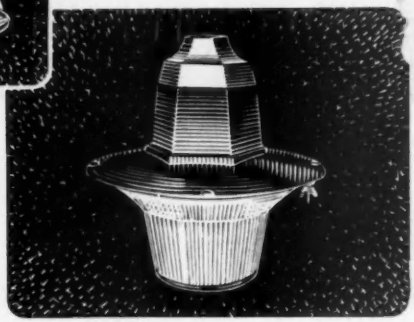

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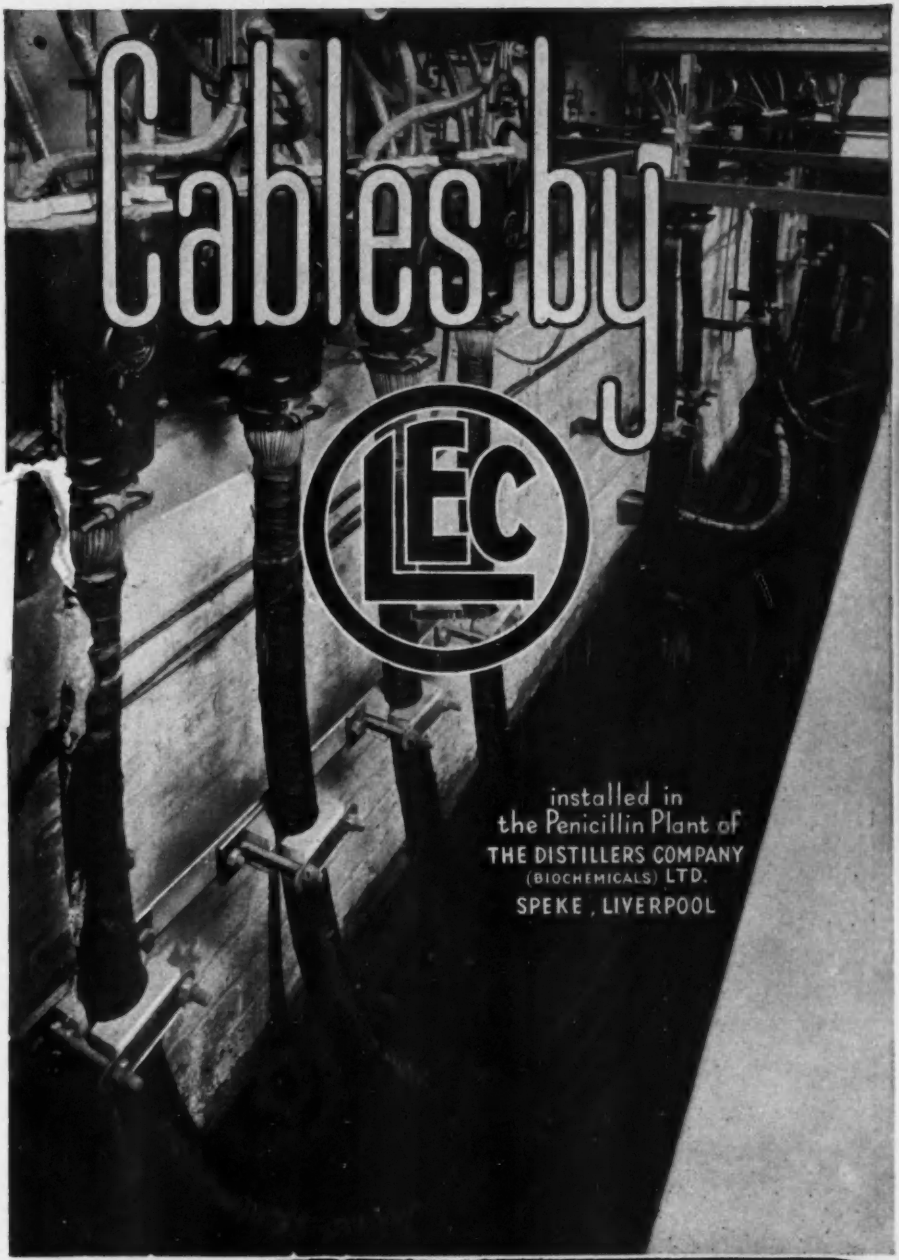

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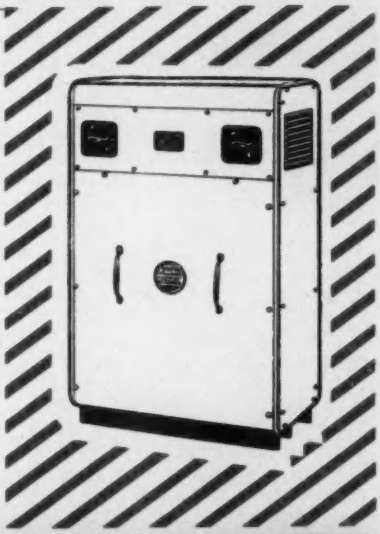

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